CONTAMINATED LANDSCAPES:
EXPLOSIVE REMNANTS OF WAR IN SUDAN

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This dissertation examines the United Nations' efforts to clear landmines and other explosive remnants of war (ERW) in Sudan. Based primarily upon seven months of fieldwork with the UN Mine Action Office in Sudan in addition to interviews in the United States and Europe, this research utilizes Michelle Murphy's concept of "regimes of perceptibility" to delineate two simultaneous yet conflicting ways of approaching and addressing environments in Sudan contaminated with mines/ERW. This dissertation brings an STS analysis into policy and decision-making discussions by using regimes of perceptibility to highlight possible strategies for addressing the threat of mines/ERW to local communities.

BIOGRAPHICAL SKETCH

Benjamin Wang is a native of California, where his parents made their new home upon immigrating to the United States. He earned a B.A. in philosophy and history with high distinction from the University of California, San Diego. When this dissertation was filed, he was a contractor supporting the work of the U.S. Department of State's Office of Weapons Removal and Abatement.

To the children, women, and men whose lives make the world better for the rest of us.

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have all taught me much and helped me become a smarter, better person.

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LIST OF ACRONYMS

AP	Anti-Personnel landmine
AT	Anti-Tank landmine
BOI	Board Of Inquiry
CL	Community Liaison
DA	Dangerous Area
EOD	Explosive Ordnance Disposal
ERW	Explosive Remnants of War
FPDO	Friends of Peace and Development Organization (Sudanese NGO)
GICHD	Geneva International Center for Humanitarian Demining
GPS	Global Positioning System
ICBL	International Campaign to Ban Landmines
IMAS	International Mine Action Standards
IP	Implementation Plan
LIS	Landmine Impact Survey
MAG	Mines Advisory Group
MDD	Mine Detection Dog
MRE	Mine-Risk Education
NGO	Nongovernmental Organization
NMAC	Sudan National Mine Action Center
NR	Sudan Northern Region
NRMAO	United Nations Mine Action Office, Northern Region Mine Action Office
NTSG	Sudan National Technical Standards and Guidelines
PPE	Personal Protective Equipment
QA	Quality Assurance
SAC	Survey Action Center

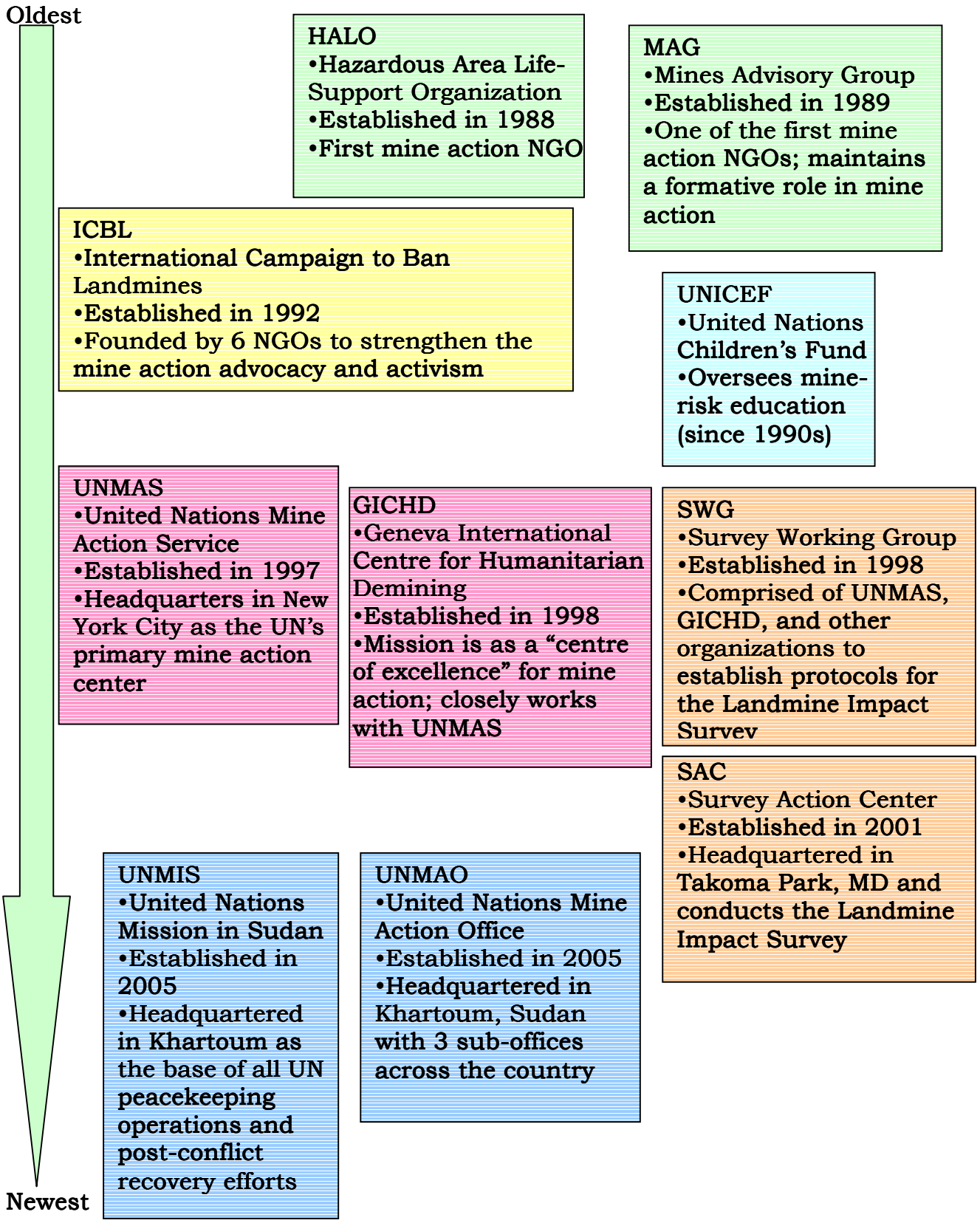
SAF	(North) Sudan Armed Forces
SHA	Suspected Hazardous Area
SOP	Standard Operating Procedures
SPLA	(South) Sudan People's Liberation Army
TDI	The Development Initiative
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
UNMAO	United Nations Mine Action Office (Sudan)
UNMAS	United Nations Mine Action Service (New York)
UNMIS	United Nations Mission In Sudan
UXO	Unexploded Ordnance
VA	Victim Assistance
WFP	World Food Programme

TIMELINE OF KEY MINE ACTION EVENTS

1980s	Rural community development and public health rapid assessments lay epistemological groundwork for socio-economic surveying in mine action.
1987	UN hires military engineers to train Afghan refugees in Pakistan to clear mines. While trained, the refugees lacked equipment and infrastructure to work.
1988	The HALO Trust hires former military engineers with mine warfare experience to clear mines/ERW in Afghanistan.
Late 1980s / Early 1990s	First mine awareness programs begin as precursors to current mine-risk education.
1991	Mines Advisory Group conducts the first socioeconomic survey of a mine/ERW-affected country, beginning a new trend in surveying to frame mines/ERW in terms of their socio-economic "impact" rather than quantifying and locating mines/ERW. This trend lays a foundation for later Landmine Impact Surveys.
1992	Six international NGOs establish the International Campaign to Ban Landmines.
1996	First efforts to mandate mine-risk education under international law; (South) Sudan People's Liberation Army declares a moratorium on laying new landmines.
1997	The Mine Ban Treaty becomes international law. UN General Assembly creates the UN Mine Action Service; international standards for mine clearance and surveys are established.

1998	The Survey Working Group is established. Sudan begins limited mine-risk education.
1999	First Landmine Impact Survey completed in Yemen. First edition of International Mine Action Standards (IMAS) are accepted by the UN after two years of deliberation. The definition of "clearance" was a critical issue.
2002	Sudan and South Sudan agree to ceasefire. UN-overseen clearance begins. UNICEF sends its first of three mine-risk education advisors in as many years.
2003	The first mine-risk education IMAS are drafted but not adopted until 2004.
2005	Sudan and South Sudan agree to a six year Comprehensive Peace Agreement; UN establishes its Mission in Sudan (UNMIS).
2006	Sudan establishes its National Mine Action Center with jurisdiction over the North and South.
2008	*Landmine Monitor* begins publishing results of the Landmine Impact Survey.
2009	Landmine Impact Survey of Sudan is completed. The field of mine action deliberates the role of community liaison in mine-risk education.
2011	South Sudan gains independence. UNMIS concludes. Conflict breaks out between Sudan and South Sudan.

OVERVIEW OF KEY MINE ACTION ORGANIZATIONS



INTRODUCTION: LANDMINES AND SUDAN

Figure 1: A United Nations Mine Action Office official stands in front of an Iranian No. 4 antipersonnel landmine near the village of Haldet Sharq in Kassala state, Sudan. March 2011.

It's hard concentrating in the Saharan heat. The strong sun can make it all too easy to lose your focus, and in some regions of Sudan, the uniform desert landscape lulls you into its monotony, with your thoughts, movements blurring together. It would not be apparent traveling across the country for the first time – or returning after spending several years away – that people had suffered through decades of civil war. Nor would it be immediately clear that landmines

and other explosive remnants of war (ERW) litter the landscape. But given this often invisible reality, how do you know where it's safe to walk? It is a simple question, or seemingly so; yet in places that witnessed protracted conflict, a simple act such as a step cannot be taken for granted.

Because it is almost impossible to know where mines and other ERW such as mortars, cluster bombs, and unexploded ammunition are buried from looking at the landscape, Sudanese communities and authorities have turned to outsiders who come with large-scale technologies to detect and clear mines/ERW. With approval from the United Nations in Sudan and the Sudanese authorities, the outside organizations compete for commercial tenders and grants or come into the country with funding secured from foreign donors to clear those explosive hazards. There are a wide range of other rationales and motives for requesting and soliciting assistance, from profit, foreign policy interests, and self-promotion, among others, but ostensibly, the confirmed presence and potential for harm from mines/ERW is one part of such efforts.

There are numerous ways to confront the notion, or rather, the "reality" that just a few inches below the yellow sand and earth could be hundreds of antitank mines, about the size of a dinner plate and capable of destroying an armored vehicle, let alone a civilian car or a

person riding a camel. Moreover, surrounding the antitank mines could be antipersonnel mines, small enough to hold in one hand and designed to blow off a soldier's leg and placed in close proximity to the antitank mines to prevent disarmament. These mines are successful in that regard as professional civilian deminers in Sudan and across the globe are among the victims of these mines.

Traditionally, almost all of the efforts to clear mines/ERW – which insiders have termed "mine action" – have been conducted by top-heavy institutions. These institutions rely on a wide variety solutions, including material technologies and individuals with particular expertise. Expatriate managers, heavy and specialized equipment, fleets of Land Cruisers, emblazoned insignias, standardized procedures, and expertise with mines/ERW that comes from both military training and clearance experience in other countries are salient features of mine action organizations.

All of this *stuff*, though, does not actually guarantee effectiveness, even though much of it is extremely expensive: landmines can remain after a clearance team has supposedly cleared land. Nor does it guarantee cost effectiveness: a large portion of cleared land – in some cases an overwhelming majority – does not in fact have any mines/ERW in the first place. Given that clearing one square meter in Sudan costs between US$3 and US$17, international

donors and the organizations that solicit foreign aid perceive clearing "empty" land as cost prohibitive at best and wasteful of limited resources at worst. But, the possible human risks to mines/ERW remain a concern. In that regard, a landmine has accomplished one of the objectives of those who laid it: denying use and travel across an area of land, even without being detonated. Or even being materially present. Such issues are just a few of many confronting communities, the government, and international organizations as they contend with contaminated landscapes across Sudan and other mine-affected countries.

This dissertation explores various efforts to address the problem of mines/ERW in Sudan. I focus on the UN's response to landmines as it works with other social groups and utilizes an array of technologies, each with a history and politics that are introduced into the environment. Little of the literature on mine action has critically examined the actual practices through which mine action is defined and carried out, and I seek to address this lacuna. By examining three core activities of mine action in Sudan – conducting a nationwide Landmine Impact Survey, providing mine-risk education to Sudanese communities, and clearing mines/ERW across the country – I show how different groups have distinct perspectives and approaches to the problem of mines/ERW in the environment of Sudan. To give one brief

example: clearance organizations seek to avoid clearing land that does not contain any mines/ERW in order to preserve scarce resources (viz. funding, although ensuring total clearance is difficult). However, local communities and humanitarian aid organizations that travel across the country would prefer absolute guarantees of safety and comprehensive clearance, even when this means "clearing" what proves to be "empty" land.

In my analysis, I draw on Michelle Murphy's concept of "regimes of (im)perceptibility," which explains

> what phenomena come into being for us, giving objects boundaries and imbuing them with qualities. Regimes of perceptibility populate our world with some objects and not others, and they allow certain actions to be performed on those objects.[1]

I use regimes of perceptibility not only to analyze and illuminate what these actors say and do, but also to show that the very *things* they are seeing and responding to are contingent on the actors' history and politics. Moreover, when different mine action organizations and the local communities who live with mines/ERW interact, so too do their histories and their ways of seeing – and not seeing – the contaminated landscapes of contemporary Sudan. For policy and decision makers, the international framework or implementation plans for addressing

[1] Michelle Murphy, *Sick Building Syndrome and the Problem of Uncertainty: Environmental Politics, Technoscience, and Women Workers* (Durham: Duke University Press, 2006), 24.

these landscapes are contingent on which regime of perceptibility in mine action they adopt.

Understanding the Place of Sudan

To understand some of the wider implications and considerations of the landmine/ERW challenge in Sudan, a few key dimensions of Sudan's recent history are worth bearing in mind. Sudan is the subject of a fair amount of academic and journalistic attention (the latter motivated by the on-going Darfur conflict and the South's recent independence in July 2011), and my purpose here is not to retread the work of other scholars so much as it is to provide a context for understanding critical aspects of this dissertation and highlighting constitutive elements of the issues at hand.

Figure 2: The previous boundaries of Sudan which included the North and South until July 9, 2011. Map from CIA World Factbook.[2]

Modern Sudan emerged as an autonomous, postcolonial nation in 1956 when England and Egypt ended their joint "condominium" rule over the country (condominium rule refers to the arrangement between England and Egypt in which Egypt appointed a governor-

[2] Oscar Anthony Balloveras, "Sudan" Wiki, *Geneseo Food Research*, May 5, 2011, https://wiki.geneseo.edu/display/food/Sudan.

general with colonial approval to oversee Sudan in 1899). World War II was a significant factor in decolonization with England weakened and Northern Sudan's pro-independence nationalist movement gaining momentum. At the same time England sought a way to extricate itself from Sudan given the civil war that had begun 1955 and pitted the North against the South. South Sudan has perpetually struggled against the North's influence and control: its location along the Nile headwaters is highly sought after and Northern Arab slave traders targeted darker skinned Africans.

The First Sudanese Civil War spanned nearly two decades from 1955 to 1972 and left an estimated 500,000 dead. In 1972, the North and South reached a peace deal with the Addis Ababa Agreement in which the South earned limited political autonomy and was temporarily freed from the prospect of Islamic sharia law.[3] However, there was no meaningful resolution to the other sources of contention that led to the brutal civil war, such as the North's appropriation of natural resources – principly Nile water flow – and the lack of agricultural development in the South. It was not until 1979 that Sudan's large oil reserves were discovered by Chevron[4]

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[3] Sharia law is a moral and legal code derived from Islam's Koran and the teachings of the prophet Mohammed, interpreted to varying degrees of literalism. See "BBC - Religions - Islam: Sharia," September 3, 2009, http://www.bbc.co.uk/religion/religions/islam/beliefs/sharia_1.shtml.

[4] Richard Cockett, *Sudan: Darfur and the Failure of an African State* (New Haven: Yale University Press, 2010), 54.

A little more than a decade later, in 1983, the North and South resumed conflict when then-President Jafaar Nimieri unilaterally declared all of Sudan under sharia law, a hostile provocation deliberately targeted to antagonize the South. Given the Christian majority of the South, Nimieri's 1983 edict sparked more than two more decades of war, with the battles during the Second Sudanese Civil War (1983 – 2005) focused on four areas: 1) the central Nuba Mountains in Southern Kordofan state (strategically important as a highlands and a natural divider between the North and South), 2) the Abyei area also in Southern Kordofan state (long contested by indigenous communities and seasonal animal herders, but not historically a site of mass violence until recently), 3) the eastern border with Ethopia and Eritrea in Blue Nile and Kassala states, and 4) the South. An estimated two million people died during this conflict and another four million people were displaced from their homes.[5] The overwhelming majority of deaths were civilians who died as a result of war-exacerbated droughts and starvation.

[5] "UNMIS Background," *United Nations Mission in the Sudan*, accessed August 23, 2012, https://www.un.org/en/peacekeeping/missions/unmis/background.shtml.

Figure 3: 1) Nuba Mountains, 2) Abyei, 3) Eastern border, 4) South Sudan.[6]

[6] Ezilon Maps, "Political Map of Sudan and Sudanese Country Map," 2009, http://www.ezilon.com/maps/africa/sudan-maps.html.

The high death toll was also facilitated by the availability of weapons in a strife-ridden country. Since Sudanese independence, all manner of Soviet arms (or weapons made outside of the USSR based on Soviet designs) made their way to both the North and South: tanks, artillery, heavy guns, missiles, small arms/light weapons, and landmines.[7] It is also worth noting that from 1983 to 1988 (the only time in modern Sudan's history without civil war), the United States provided approximately US$120 million of American arms, munitions, and equipment to Sudan to counter Ethiopian and Libyan forces backed by the USSR as a part of the U.S. containment strategy; when the Soviet Union fell in 1991, Ethiopia began providing arms to the South Sudanese People's Liberation Army.[8] Britian, Bulgaria, China, France, Norway, Poland, and Saudi Arabia are also among the many countries that have provided military support to various groups in Sudan after independence, in line with their respective ideological commitments and commercial interests.[9] Since the 1990s, Libya and China were the main suppliers of weapons to Sudan (both Soviet/Russian weapons as well as Libyan and Chinese weapons

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[7] Federal Research Division, Library of Congress, "Sudan - Foreign Military Assistance," *Library of Congress Country Studies*, June 1991, http://lcweb2.loc.gov/cgi-bin/query/r?frd/cstdy:@field(DOCID+sd0153).

[8] Robert Collins, *A History of Modern Sudan* (Cambridge UK; New York: Cambridge University Press, 2008), 203.

[9] Ibid., 253.

based on Soviet/Russian designs), mostly to the North and to the South as well (China's involvement with Sudan since the 1970s always included military assistance).[10]

By the late 1990s and early 2000s, various international efforts by countries including the United States and Norway along with the United Nations and the East African Intergovernmental Authority on Drought and Development began to gain traction in de-escalating and ending the war between the Government of Sudan's Sudan Armed Forces (SAF) from the North and the South's Sudan People's Liberation Army (SPLA).[11] A series of peace building measures beginning on July 20, 2002 culminated in a Comprehensive Peace Agreement signed by the North and South on January 9, 2005.[12]

With the formal end of hostilities, the United Nations established its largest and most expensive peacekeeping mission in the history of

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[10] Ibid., 231.

[11] SPLA/M is the accepted shorthand to denote both the armed forces that fought the civil war and the political body that ostensibily represents the people for whom the armed forces fought. In reality, there is almost total overlap between the armed forces and the political body; commanders and soldiers function also as political leaders.

[12] Eric Reeves, "A United Nations Peace Support Operation for Sudan: Urgent Needs, Lethargic Planning," *Www.sudanreeves.org: Sudan Research, Analysis, and Advocacy*, November 14, 2003, http://www.sudanreeves.org/2004/12/17/a-united-nations-peace-support-operation-for-sudan-urgent-needs-lethargic-planning-november-14-2003/; Eric Reeves, "US State Department Policy on Sudan," *Www.sudanreeves.org: Sudan Research, Analysis, and Advocacy*, November 7, 2005, http://www.sudanreeves.org/2006/01/03/us-state-department-policy-on-sudan-november-7-2005/.

the organization: the United Nations Mission in Sudan (UNMIS).[13] Its primary goal was to facilitate an eventual referendum on South Sudanese independence, initially planned for six years after the Comprehensive Peace Agreement was signed. Humanitarian assistance and other relief also constituted the UNMIS's work. Such work targeted the millions of internally displaced people across Sudan. At the end of 2010, the Norwegian Refugee Council's Internal Displacement Monitoring Centre estimated 4.5 to 5.2 million people had been removed from their homes; even after Sudan's reduction in size and population with Southern independence, the UN High Commissioner for Refugees officially considers more than 2.4 million Sudanese as internally displaced persons.[14]

When I began this dissertation project in 2009, "Sudan" referred to a single country; South Sudan was semi-autonomous and still a part of Sudan. After holding a referendum on whether to remain a part

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[13] "UNMIS Facts and Figures," *United Nations Mission in the Sudan*, accessed August 24, 2012, https://www.un.org/en/peacekeeping/missions/unmis/facts.shtml. The total cost of the UN peacekeeping mission from its early stages beginning in July 2004 till the complete disposal of all assets in June 2012 totaled an estimated US$5.76 billion. At peak deployment levels, UNMIS was comprised of more than 10,000 uniformed soldiers, military observers, and police, nearly 1,000 international civilian staff, 3,000 local civilian staff, and 500 United Nations Volunteers. Over the course of the mission, the UN recorded 60 fatalities without listing the cause of death: 23 were soldiers, 3 police, 3 military observers, 8 international civilians, 22 local civilians, and 1 listed as "other."

[14] Internal Displacement Monitoring Centre, "Country Page: Sudan," December 31, 2011, http://www.internal-displacement.org/countries/sudan; United Nations High Commissioner for Refugees, "Sudan: 2012 UNHCR Country Operations Profile," accessed November 5, 2012, http://www.unhcr.org/pages/49e483b76.html.

of Sudan in July 2011, South Sudan became an autonomous nation-state (I discuss below how this referendum came to be held). At the risk of committing a slight anachronism, for the sake of consistency throughout this dissertation I use "Sudan" to refer both to

- the North, dominated by the Arab Muslim majority who are centered in riverain Khartoum. This majority actively excludes and marginalizes the Fur in the west (Darfur), the Beja and other smaller groups such as the Rashaida in the east, and the Nuba in the central region, and numerous other smaller groups such as Rashaida herders in the east;[15]
- the South where ethnic Dinka who practice Christianity and animism are the largest ethnic and political group among dozens of ethnicities and tribes. International organizations and major powers oftentimes back the Dinka, tribal differences among the 25 Dinka groups make such support less solid than outsiders intended.[16]

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[15] Central Intelligence Agency, "Sudan," *The World Factbook*, September 21, 2012, https://www.cia.gov/library/publications/the-world-factbook/geos/su.html; Sara Pantuliano, *Comprehensive Peace? Causes and Consequences of Underdevelopment and Instability in Eastern Sudan* (International Rescue Committee, September 2005); Richard Rottenburg, Guma Kunda Komey, and Enrico Ille, *The Genesis of Recurring Wars in Sudan: Rethinking the Violent Conflicts in the Nuba Mountains / South Kordofan* (University of Halle, Germany, October 2011).

The Fur are non-Arabized Muslims who traditionally rely on sedentary agriculture. The Beja are primarily nomadic camel herders and breeders and are also non-Arab Muslims. The Rashaida are financially better-off than the previous groups, in part because they are not discrimminated against by fellow Arabs and their history as smugglers, initially of cattle. The Nuba are the most heterogenous group, and the singluar term "Nuba" belies wide historical, cultural, social and political differences. The primary reason for one label for a people who are divided into more than 50 language and dialect groups is by virtue of their present location in the central and strategic Nuba Mountains. For more detailed descriptions of Sudan's population groups and their relation to the central state, see Douglas Hamilton Johnson, *The Root Causes of Sudan's Civil Wars* (James Currey Publishers, 2003).

[16] Central Intelligence Agency, "South Sudan," *The World Factbook*, September 4, 2012, https://www.cia.gov/library/publications/the-world-factbook/geos/od.html; Johnson, *The Root Causes of Sudan's Civil Wars*, 51–53.

Figure 4: The current boundaries of Sudan as of June 2011 upon South Sudan's independence. Map from CIA World Factbook.[17]

[17] Central Intelligence Agency, "Sudan."

Figure 5: The newly created nation of South Sudan as of June 2011. Map from CIA World Factbook.[18]

Much of Sudan's post-independence history is described in the mine action literature and documents in a concise yet clichéd shorthand. Funding proposals by UNMIS and concept notes[19] by international aid organizations explain the extent of Sudan's conflict

[18] Central Intelligence Agency, "South Sudan."

[19] A concept note is a proposed project an organization presents to a donor. The organization lays out the scope of the work it claims to be able to do and the cost of performing that work. If the location, type of work to be performed, and cost align with the donor's interest, the donor then funds the organization.

as being the "Arab North versus Christian and animist South,"[20] with generic statements along the lines of "more than two decades of conflict between the North and the South, ending with the 2005 Comprehensive Peace Agreement."[21] Journalist Jina Moore describes a similar trope in writing about contemporary issues as

> nearly every story I published from Rwanda in my three years reporting there included a reference to the 1994 genocide. Dredging up suffering can win a busy audience's attention, but it's a limited kind of attention. It's the attention of the kind-hearted stranger from a distance, the reader who stops eating his breakfast or reading her stock quotes to remember just how bad it is in other places.[22]

Such strategic reduction also serves humanitarian-identifying organizations as they seek to maintain apolitical neutrality. Delving into Sudan's recent history and exploring the specific details of the civil war would arguably present opportunities for the inevitable value judgments that arise in deciding how to frame the conflict in a narrative and the diction used in such a narrative (the most powerful example being the policy debates around the term "genocide"). By reducing decades of conflict into a handful of vague standardized sentences, humanitarian-identifying organizations seek to avoid any

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[20] Jina Moore, "The White Correspondent's Burden," *Boston Review*, August 2, 2012, http://www.bostonreview.net/BR37.4/jina_moore_africa_journalism_colonialism.php.

[21] I do not intend to single out mine action actors here as being ignorant or uninformed. Mine action actors are no better or worse than other groups involved in Sudan, and the general level of their knowledge is fair and understandable given both their work in the country and the constraints on their time.

[22] Moore, "The White Correspondent's Burden."

controversy that might impede their efforts or official permission to operate. Indeed, "outsiders…have only looked at the areas or particular aspects of Sudan that have reflected their own agendas and interests."[23] As a scholar, I too have interests: the primary one is to expand on the recent mine action efforts and situate the present within a broader set of social-technical interactions. That is, beyond the physical objects, tools, and equipment associated with clearing mines/ERW, I want to tie the assumptions, values, and history of these *things* into the picture.

Despite the politics of history and historical narratives, it is worth digging deeper into the complex and contested processes that contributed to decades of civil war in Sudan. In his book *The Root Causes of Sudan's Civil Wars*, Sudan scholar Douglas Johnson identifies two prevailing yet opposing explanations for the conflicts between North and South Sudan: centuries of exploitation and slave-raiding on the part of Northern "Arabs" against Southern "Africans;" or outside imperialist interventions creating artificial divisions across a Sudanese Islamic country which did not divide the nation in two along "African" and "Arab" lines. Yet, as Johnson argues, "religion, local perceptions of race and social status, economic exploitation, and colonial and post-colonial interventions are all elements in the Sudan's

[23] Cockett, *Sudan*, 3.

current civil war, but none, by itself, fully explains it."[24] Johnson argues for a deeper historical understanding beyond colonialism's unequal legacy, including

> the exploitative nature of the central state towards its [natural resource] rich, but uncontrolled hinterland, the coercive power of the army in economic as well as political matters, the prerogative of the leader in redistributing revenues to the peripheries, (and) the ambiguous status of persons who are not fully part of the central heritage.[25]

These eighteenth- and nineteenth-century developments *within* Sudan are what constituted legitimate power and governance in Sudan.

According to Johnson, then, pre-colonial divisions contributed to long-lasting and currently unsolved conflict. These divisions were predicated on multiple social divisions and then embedded into territorial boundaries and administrative structures and policies. Self-identifying as Arab did not preclude or end conflict, but it was a dimension of inclusion in or exclusion from the state and its protection as well as participation/integration in the economy. Johnson writes:

> While international church groups [primarily Christian] focus on the religious issue as exclusively defined by the freedom to worship, and Western politicians see religious affiliation in terms of 'minority rights', the economic aspects of religious, (sic) and racial oppression in the Sudan are largely ignored, masked as they are by the language of development.[26]

These longstanding issues around the construction of power and

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[24] Johnson, *The Root Causes of Sudan's Civil Wars*, 1–2.

[25] Ibid., 7.

[26] Ibid., 75.

international responses to subsequent oppression play out in the present as The Economist's Africa Editor Richard Cockett illustrates in discussing how present "governance" tends to interpret the past:

> The British might have been responsible for erecting the barriers between North and South Sudan in the first place and for treating Southerners as second-class citizens. But here, as in other respects, the Muslim politicians who succeeded the British in Khartoum merely took their cue from their former colonial masters. Perhaps even more so, for the Muslims of the North, themselves on the fringes of the Arab world, had their own reasons to be dismissive of Southern claims to equal rights and economic opportunities."[27]

Cockett's point omits Johnson's historicity in that the British colonial legacy was itself predicated upon existing marginalization between Khartoum as the central city and Sudan's vast hinterlands, but his claim about Sudan's recent history still holds. Indeed, the "paradox of Khartoum, of a core of wealth and optimism surrounded by rings of extreme poverty, injustice and political exclusion, is also the paradox of Sudan."[28] The late geographer Neil Smith's theory of "uneven development" captured this paradox as he sought to call attention to how different places burden costs and reap the benefits of capitalist development in unequal fashion.[29]

Causes are clearly contested. Nonetheless, one significant legacy

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[27] Cockett, *Sudan*, 41–42.

[28] Ibid., 19.

[29] Neil Smith, *Uneven Development: Nature, Capital, and the Production of Space*, 3rd ed. (University of Georgia Press, 2008), 99.

of the history of Sudan's conflicts is that all the landmines and other explosive remnants of war laid by the Sudan Armed Forces and Sudan People's Liberation Army initially laid against combatants now pose a serious threat to civilians and humanitarian aid workers. Unlike countries such as Cambodia and Laos, mine action programs are not being established in Sudan decades after the bombardment ceased. While some mines/ERW remained from the first civil war from 1955 to 1972 (and possibly even from World War II), the majority of the mines/ERW are from the most recent civil war from 1983 until the 2002 ceasefire. Mine action in Sudan began almost immediately after the North and South laid down their arms after the long-burning conflict. The relatively recent mine action interventions therefore provide a methodological opening to examine the constructive processes that constitute mine action in contemporary Sudan. Had such processes been underway for decades (as in the case of other mine/ERW-affected countries), identifying and analyzing the decisions that established mine action in Sudan would be much more difficult.

The Rise of Professional Mine Action

My purpose in laying out some institutional history about mine action in this section is to outline the crucial dynamics at play in Sudan. Such history and politics shape how the UN, commercial

contractors, international NGOS, and the expatriate staff that manage these organizations actually work in Sudan. A critical part of this history is how the mine action community has tried to professionalize itself, seeks to present itself as professionals to other actors (particularly policymakers and donor nations), and frequently invokes the language of professionals to establish their own legitimacy.

The first humanitarian, non-military efforts to clear and remove landmines were in Afghanistan by the nongovernmental organization The HALO Trust (HALO). In 1988, HALO began using men with technical experience with mines through previous military training to clear the countless mines Soviet forces used against Afghans, most notably in Kabul and Parwan provinces.[30] One year earlier, the UN had attempted a program under the auspices of its emergency relief effort Operation Salaam for military (de)miners to train Afghan refugees in Pakistan in mine clearance; while 13,000 men gained the necessary skills, they lacked the infrastructure – equipment, vehicles, administrative support, and coordination – to employ those skills. Thus by 1989, the UN moved away from training local Afghans towards on-the-ground coordination, ceding training to smaller NGOs whose staff had more experience with clearance from earlier military

[30] Survey Action Center, *Landmine Impact Survey - Afghanistan: Executive Summary*, 2005, 3, http://www.sac-na.org/pdf_text/afghanistan/AFG_ExecSummary_Engl.pdf.

training in their previous occupation. Other mine/ERW-focused NGOs, most notably Mines Advisory Group, emerged in Afghanistan at this time as well.

That humanitarian demining taking place first in Afghanistan is notable, given there were several countries across the globe which were suffering the same fate to the same extent. Mike Croll, Rae McGrath, Matthew Bolton, and others who have written deeply about mine action all chronicle the condition of Southeast Asia and sub-Saharan Africa. McGrath points out that Afghanistan in the late 1980s provided "a classic good-versus-bad story for the Western media – invasion by a hugely superior (and communist) external force being resisted by brave but poorly armed local fighters with colourful history. The facts were, as ever, somewhat more complex, but why spoil a good story with detail?"[31] With the experience of Afghanistan in hand, mine action organizations began expanding their areas of operations in the late 1980s and into the 1990s to other mine/ERW-affected countries in Southeast Asia and sub-Saharan Africa where mines/ERW have been a longstanding humanitarian issue.[32] This work is particularly

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[31] Rae McGrath, *Landmines and Unexploded Ordnance: a Resource Book* (London, UK: Pluto Press, 2000), 15. It is worth remembering that the United States supported the anti-Soviet forces in Afghanistan under the Reagan Doctrine, in part by supplying weapons. Besides the immediate consequence of contributing to the landmine/ERW issue, the implications of American involvement reverberate into the current war.

[32] Southeast Asia's mine/ERW contamination in large part is a part of the United States' explosive legacy across the region. The U.S. has released its Vietnam War-era

notable because it initially departed from earlier efforts towards clearing mines/ERW. In the past, mine clearance was carried out by *militaries*, often working in the context of *combat*, and far short of the present holistic approach of mine action. Even in post-World War II Europe, mine clearance and reconstruction was overseen by various militaries.[33]

In 1992, six leading NGOs – Human Rights Watch, Medico International, Handicap International, Physicians for Human Rights, Vietnam Veterans of America Foundation, and the Mines Advisory Group – came together to establish the International Campaign to Ban Landmines (ICBL). All six NGOs had experience working with survivors from mines/ERW across the globe, and when the Cold War ended with the fall of the Soviet Union, the NGOs saw the potential for a global ban on landmines.[34] Such a ban could be a step towards building world peace, so the thinking went for these organizations. In addition, collectively, the NGOs had experience in Afghanistan as well as other mine/ERW-affected countries in Southeast Asia and Sub-Saharan

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military records of its bombing missions to assist national authorities and NGOs in countries like Cambodia and Lao establish a baseline for resource planning and a starting point for where to begin clearance.

[33] Sayed Aqa, "Mine Action: Success and Challenges," *Journal of Mine Action* 9, no. 1 (August 2005), http://maic.jmu.edu/Journal/9.1/Focus/aqa/aqa.htm; Mike Croll, *Landmines in War and Peace: From Their Origin to the Present Day* (Barnsley, U.K.: Pen and Sword, 2009), 137.

[34] Jody Williams, "The International Campaign to Ban Landmines - A Model for Disarmament Initiatives?," *Nobelprize.org*, September 3, 1999, http://www.nobelprize.org/nobel_prizes/peace/laureates/1997/article.html.

Africa like Angola, experience, they argued, that bestowed expertise with the different aspects of mine action: global advocacy, victim assistance, mine-risk education, and clearance. However, only one founding member of the ICBL – Mines Advisory Group, headquartered in Manchester, England – had direct experience clearing mines/ERW, as the other organizations were not principally clearance organizations but instead worked primarily towards victims' assistance. The relative weight of one clearance organization's input into the ICBL compared to the input of several organizations without such expertise would have future long-term consequences as the ICBL, as both a moral symbol against civilian harm as well as a policy prescription on warfare, would have to be balanced with how clearance organizations conduct their work in the field. Some mine action practitioners – particularly those on the ground – see the Mine Ban Treaty as too idealistic and aspirational and divorced from reality and operational constraints. Thus, mine clearance organizations thus seek a balance between the high standard for signatory nations set by the Mine Ban Treaty to be mine-*free*, which the ICBL advocated for strenuously, and the material and environmental contingencies across various mine/ERW-affected countries that make mine-free an arguably cost-prohibitive proposition. (I will return to this issue throughout this dissertation).

Several developments and events made 1997 a watershed year

for mine action. The first was the culmination of five years of widespread global advocacy by the ICBL: the establishment of the *Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on their Destruction*, known as both the Mine Ban Treaty and the Ottawa Treaty (where the treaty was signed in 1997), as international law. Before Mine Ban Treaty was ratified and came into force, "it was estimated that there were between 15,000 and 20,000 new casualties [worldwide] caused by landmines and unexploded ordnance each year. Which means there were some 1,500 new casualties each month, more than 40 new casualties a day, at least two new casualties per hour."[35] The same year the Nobel Peace Prize was co-awarded to Jody Williams and the International Campaign to Ban Landmines, signaling international recognition of the landmine/ERW issue and the resulting advocacy. Although more than 150 countries have ratified the Mine Ban Treaty, more than 40 countries, including Burma, China, Iran, Israel, Russia, and the United States still fail to observe the Mine Ban Treaty.[36] Even with the Mine Ban Treaty in force, 66 countries and 7 areas not internationally

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[35] International Campaign to Ban Landmines, "The Issues: Mine Ban Treaty," *Landmine and Cluster Munition Monitor*, accessed January 11, 2012, http://www.the-monitor.org/index.php/LM/The-Issues/Mine-Ban-Treaty. International Campaign to Ban Landmines, "Mine Ban Treaty: States Not Party," *Landmine and Cluster Munition Monitor*, accessed August 24, 2012, http://www.icbl.org/index.php/icbl/Universal/MBT/States-Not-Party.

[36] International Campaign to Ban Landmines, "The Issues: Mine Ban Treaty."

recognized (e.g. Kosovo and Palestine) reported a total of approximately 5,500 casualties from mines/ERW in 2011. Almost three-quarters were civilians, half of whom were children.[37]

Given the number of countries that have not signed the Mine Ban Treaty and what some mine action actors state is an unacceptable casualty rate, the ICBL currently continues its advocacy work. One of the ICBL's principal activities is publishing annually *Landmine Monitor* which provides profiles of every mine/ERW- affected country (beginning in 2009 the ICBL also began publishing *Cluster Munition Monitor*). The profiles for each country are written and compiled by hired researchers who spend six months each year traveling to interview key officials both in-person and via email. From its website:

> Landmine and Cluster Munition Monitor is the research and monitoring initiative of the International Campaign to Ban Landmines (ICBL) and the Cluster Munition Coalition (CMC). It is the *de facto* monitoring regime for the Mine Ban Treaty and the Convention on Cluster Munitions. It assesses the international community's response to the humanitarian problem caused by landmines, cluster munitions, and other explosive remnants of war (ERW), and reports on state implementation of and compliance with relevant international legal instruments.[38]

Equally important for the field of mine action was the publication of the first issue of *The Journal of Humanitarian Demining*

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[37] Ibid.

[38] International Campaign to Ban Landmines, "Press Releases: Research Opportunity: Join the Monitor's 2012 Research Network," *Landmine and Cluster Munition Monitor*, 2009, http://www.the-monitor.org/index.php/LM/Press-Room/Press-Releases/monitor-2012-researchers-call.

also in 1997. "The Journal" (as it is referred to colloquially by many mine action practitioners and actors) would be renamed *The Journal of Mine Action* a year later, and then *The Journal of ERW and Mine Action* a decade after that. Mine action and its related issues and activities cross many disciplinary and professional boundaries, yet the journal is the only publication dedicated to the study of mine action. While the journal's readers are located in more than 150 countries, it is only printed in English.[39] The first issue of the journal detailed briefly U.S. and UN humanitarian demining efforts. By the second issue, the journal contained articles on global outreach and technology initiatives. However, the growing professionalism of mine action during the 1990s did not necessarily solve persistent questions regarding technology, efficiency, and improvement. In other words, even though mine action practitioners may have established the field as legitimate, the technologies employed by mine action organizations and how well those technologies worked were still topics of inquiry both by insiders and outsiders to the professional ranks.

Perhaps the largest institutional change that emerged in 1997 was the formal establishment of the UN Mine Action Service (UNMAS)

[39] Some mine action commentators like Matthew Bolton claim that the close relationship between the publisher – James Madison University's Center for International Stabilization and Recovery – and primary financial sponsor – the U.S. State Department's Office of Weapons Removal and Abatement – gives the State Department as one of mine action's principal donors too much control. See Matthew Bolton, *Foreign Aid and Landmine Clearance: Governance, Politics and Security in Afghanistan, Bosnia and Sudan* (London, UK: I.B. Tauris, 2010), 77–78.

and the Geneva International Centre for Humanitarian Demining (GICHD) one year later. These two institutions have become the two most prominent mine action institutions and mutually reinforce each other's position. UNMAS posits itself as the international lead organization for mine action while GICHD describes itself as a "centre of excellence" that provides technical expertise that helps guide mine action activities. GICHD also maintains the International Mine Action Standards and develops and supports the standard database system used by virtually every national mine action authority.

These two large organizations justify their existence in part by pointing to high initial estimates of the number of mines/ERW in affected areas and the need for large-scale measures, centralized planning, and coordination, which these organizations can provide. Moreover, mine action has also become an increasingly foundational part of post-conflict recovery and peace building in many countries,[40] and the UN readily stated that issues such as large scale humanitarian food aid distribution and laying the infrastructure foundation for Sudan's 2011 nationwide referendum voting all required top-down coordinated mine action. Given perpetually limited resources – namely international donor funds and aid – such

[40] Michael Hands, "Destroying Mines and Building Peace: A Study of Mine Action, Post-conflict Development and Security, in Sudan" (MA in Post-War Recovery Studies, University of York, 2010).

coordination attempts to ensure that mine action is both efficient and strategic by both "clearing areas right" and "clearing the right areas."[41]

At times, the NGOs and commercial firms that conduct the actual clearance describe the physical act of demining as simple and straightforward; one manager stated to a documentary film crew "people have turned demining into a black art, it's really very simple. We could teach all of you how to demine in three days."[42] For these groups, removing or neutralizing a mine/ERW in the ground may seem simple and direct and it is not in this case, but the UN and other higher level authorities in mine action have created extensive requirements that entail a whole path-dependent infrastructure: management, support staff, equipment, standards, regulations, and on and on, all of which raise costs.[43] Such requirements serve both individuals' and organizations' need to secure funding necessary to perpetuate themselves while also simultaneously creating and addressing different conceptions of risk management.

Thus, a singular action – the movement of sweeping a metal

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[41] Håvard Bach, "Clearing Areas Right; Clearing the Right Areas," *The Journal of ERW and Mine Action* 13, no. 2, Annual Issue: Land Cancellation and Release (August 2009), http://maic.jmu.edu/journal/13.2/focus/bach/bach.htm.

[42] Brian Liu and Mary Wareham, *Disarm* (Indiepix, 2009).

[43] Arezou Azad, *Post-Conflict Coordination -- The Case of the United Nations Mine Action Service: Lessons Learned* (United Nations Peacekeeping, June 2006), 23, http://www.peacekeepingbestpractices.unlb.org/PBPS/Library/Post-Conflict%20Coordination%20The%20Case%20of%20UNMAS%20Lessons%20Learned.pdf.

detector – is laden with different meanings: the removal and disposal of a potentially fatal threat, an occupational responsibility that leads to a good salary, facilitating efficient aid delivery, the creation of a post-conflict peace dividend. The ability of clearance practitioners to claim a high level of their expertise – even while readily acknowledging their own limits – is very much a power generating maneuver that can be analyzed.

For better and for worse, more than two decades of such mine clearance actions across the globe reveals that large portions of areas that undergo clearance in fact contain no hazards. For instance, one NGO, Handicap International, found mines/ERW in only one third of the area it cleared in Mozambique in 2008. Another NGO, Mines Advisory Group, located mines in less than half of the areas it cleared in 2007 in Cambodia, widely seen as one of the most mine-affected countries in the world. In these cases, nothing is "cleared." One expert affiliated with Survey Action Center (the producers of the Landmine Impact Survey discussed in chapter one) estimated that "less than 5 percent of [Suspected Hazardous Areas] prove to have any mines in most countries, and many clearance operations find none at all."[44] In a country like Sudan where the average cost from 2007 through 2010 to

[44] Charles Downs, "Survey and Land Release: Lessons from Recent Country Experience," *The Journal of ERW and Mine Action* 13, no. 2 (August 2009), http://maic.jmu.edu/journal/13.2/focus/downs/downs.htm.

clear a square meter was approximately US$10 (decreasing from US$17/square meter in 2007 to US$3.50/square meter by 2010), clearing an American football field can cost US$60,000 and take up to 140 manpower days.[45] Given that Sudan was the largest country by area on the African continent before Southern independence – approximately four times the size of France – 140 days for a single football field means that clearing all the mines/ERW in Sudan would be a virtually interminable task.

Consequently, concerns like these in Sudan and across the globe have led mine action practitioners to develop "land release." Land release is a recently codified approach to mine clearance that shifts clearance techniques away from wholesale clearance of areas suspected of having mine/ERW contamination through expensive technologies to a strategic tactic where areas are deemed to have little to no risk by initially using less-costly methods and escalating the response only as deemed necessary, thereby reserving precious financial and other resources for areas believed to be high risk. I will address this issue in more detail in chapter three.

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[45] Armen Harutyunyan, "The UNMAO -Northern Region (Presentation to GICHD)" (Khartoum, Sudan, December 12, 2010). An American football field is approximately 110 meters long and 50 meters wide, which equates to more than 5,500 square meters. While a numerical average obscures conditions, a moderately useful rule of thumb is that one manual deminer can clear approximately 40 square meters a day over six hours of work. A high degree of non-explosive metal contamination can hinder a deminer's producticity, and various terrain conditions have an effect as well.

At this point, I want to note that while cost-savings are a priority for mine action, a less expensive activity than mine/ERW clearance is not always the preferred solution. For example mine-risk education, a category that encompasses a wide variety of activities including public outreach, education, and information dissemination to local communities is much less expensive than demining activities, as a team of three educators with printed materials does not require the same support as a dozen deminers with all their necessary equipment in a command-and-control structure. Yet, despite its financial advantages, mine-risk education suffers from a high degree of professional criticism.

In the context of Sudan, the majority of funding for mine action came from the budget for the UN peacekeeping mission, which from 2005 through the first half of 2011 was the UN's largest in its history. For the UN, mine action was a prerequisite for other humanitarian efforts: safe passage across the country's major routes and the ability to build infrastructure require mines/ERW be cleared. For traditional donor nations such as the United States, Norway, and Italy, funding mine action was part of a country's support for humanitarian concerns and its foreign policy as well as a means of reaching a policy goal: regional stability, supporting a strategic ally (Norway has been long committed to South Sudan as it has struggled against violent

oppression from the North), and/or maintaining a historical interest in a region (e.g., Italy's interest in eastern Sudan is due in part to the proximity of Eritrea and Ethiopia, former Italian colonies).

Mine action in Sudan thus supports the point Sudan scholar Douglas Johnson and many others have made: "the direct involvement of UN agencies and other NGOs in the support of development projects and provision of services formerly the responsibility of the civil administration further distanced the government from its citizenry."[46] Mine action exacerbates this abdication, in part, by choosing to avoid addressing a central dilemma in post-civil war Sudan: "[international agencies] are called upon to alleviate the effects of the disaster-producing activities of their major counterparts: the government of the Sudan and the Southern [independence] movements."[47] The North and South claim they cannot afford large-scale mine action, and consequently almost all mine action is funded by international donors: Canada, the European Union, France, India, Italy, Japan, Norway, Qatar, Sweden, the United Kingdom, the United Nations, and United States have collectively given hundreds of millions of dollars. Such outside intervention has the unintentional effect of hindering the North and South from truly coming to terms with their legacy of

[46] Johnson, *The Root Causes of Sudan's Civil Wars*, 144.

[47] Ibid., 145.

conflict, as outsiders take on the task of clearing mines/ERW rather than the Sudanese militaries responsible for those explosive remnants of war. Thus, as Johnson sadly notes, "the pattern of the war indicates that resource depletion and economic subjugation are the objectives of war, not just its incidental consequences."[48] The material and social consequences of mines/ERW – driving people from their homes and lands and preventing basic livelihood practices – are painful illustrations of Johnson's point.

Arguably the most cited work on mines/ERW is Mike Croll's 1998 *The History of Landmines*, revised and republished in 2008 as *Landmines in War and Peace: From their Origin to Present Day*.[49] Like many others involved in clearance, Croll is a former British Army Bomb Disposal Officer who used his training and experience to move into humanitarian demining. Before discussing Croll's main argument in his text, it is worth noting his previous career handling explosives for a military. I discuss this issue in greater depth below, but Croll is emblematic of many of the mine clearance professionals in Sudan (and elsewhere) who draw on their military experience to establish their expertise in humanitarian mine action. There are indeed clearance professionals who do not have military engineering backgrounds, but

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[48] Ibid.

[49] Mike Croll, *The History of Landmines* (Barnsley, U.K.: Leo Cooper, 1998); Croll, *Landmines in War and Peace*.

their training and qualifications follow narrowly prescribed requirements for explosive ordnance disposal certifications. Unlike Steven Epstein's AIDS activists who developed their own lay expertise to address the issues they thought established authorities and experts were incapable of handling, mine clearance experts have largely remained self-selecting, with few outside the profession seeking entry.[50]

Yet at the same time, Croll addresses a long held point about clearance, and less directly, mine action as a whole: mines/ERW are a horror for an individual while less so for the globe. In other words, there are not very many mine/ERW survivors/victims relative to the world's population.[51] A ready anecdote within the mine action world is that roads are more dangerous than minefields in that there are many more traffic accidents than there are mine/ERW accidents. By extension, other issues facing mine-impacted countries – poverty, disease, maternal and infant mortality, etc. – are more pressing than mine action. This disjuncture between actual deaths and injuries versus media and political attention thus raises the obvious question: "so why does mine action attract proportionately so much more

[50] Steven Epstein, *Impure Science: AIDS, Activism, and the Politics of Knowledge* (Berkeley: University of California Press, 1996).

[51] Croll, *Landmines in War and Peace*, 155–156.

money?"[52] Croll points to three factors: the West/global North (who constitute the majority of the international aid community) feels guilt for being a source of mines; the intense shock that images of mine/ERW victims produce; and the attention of high profile personalities and celebrities that propagate such shock.[53]

The ICBL and its supporters offer a less cynical account for the general success of its work, both banning landmines and supporting mine action efforts like mine-risk education. Such success is the result of "global civil society" taking a strong stance on what has been successfully framed as a moral issue: clearing the explosive remnants of war that threaten innocent civilians when the militaries that lay mines and produce ERW fail to do so on their own accord.

Research Questions and Supporting Frameworks

I situate my dissertation within the two initially parallel and eventually intersecting histories of modern Sudan and professional

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[52] Ibid., 156.

[53] The 2004 edited volume *Landmines and Human Security* has forewards by Her Majesty Queen Noor of Jordan, The Honorable Lloyd Axworthy (a former Foreign Affairs Minister of Canada who led the mine-ban movement), Lady Heather Mills McCartney and Sir Paul McCartney, and U.S. Senator Patrick Leahy (a longtime advocate against landmines). The 2008 edited volume *Banning Landmines* includes a foreward from Archbishop Desmond Tutu. The most famous advocate for the Mine Ban Treaty, however, remains Princess Diana. See Richard A. Matthew, Bryan McDonald, and Kenneth R. Rutherford, *Landmines and Human Security: International Politics and War's Hidden Legacy* (Albany: State University of New York Press, 2004); Jody Williams, Stephen Goose, and Mary Wareham, eds., *Banning Landmines: Disarmament, Citizen Diplomacy, and Human Security* (Lanham: Rowman & Littlefield, 2008).

mine action to address two questions: What technologies does UNMAO – as the focal point for all mine action activities in Sudan – utilize to understand and manage Sudan's contaminated landscapes? How do mine action groups use these technologies in practice and on the ground? The choice of technologies has consequences for how mine/ERW clearance is conducted and which groups have the power to impart their vision for how the post-conflict environment should be rebuilt and developed. These questions speak to the issues of trust and expertise through technologies, both material and social, which are centrally relevant in science and technology studies.[54]

Moreover, what tensions arise between "local" and "expert" understandings of mines/ERW? It is not just so-called experts who understand mines/ERW: "people who have lived with mines for a long time possess considerable knowledge of landmines and the risks they pose. When people take risks, it is not out of negligence or stupidity but out of a considered assessment."[55] That is to say, local in the sense of being particular to one specific region or community can in some ways convey one type of mine/ERW knowledge. There are

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[54] For two noteworthy texts on trust and expertise, see Theodore Porter, *Trust in Numbers: The Pursuit of Objectivity in Science and Public Life* (Princeton: Princeton University Press, 1995); Sergio Sismondo, "Science and Technology Studies and an Engaged Program," in *The Handbood of Science and Technology Studies*, ed. Edward Hackett et al., 3rd ed. (Cambridge: The MIT Press, 2008), 13–33.

[55] Kristian Berg Harpviken, "The Future of Humanitarian Mine Action: Introduction," *Third World Quarterly* 24, no. 5 (October 2003): 779.

differences, however, in the types of understandings "experts" and local communities develop about mines/ERW. For local communities, Mine Ban Treaty activists, and policymakers who decide to allocate foreign aid for mine action, mines/ERW become "black-boxed"[56] and opaque objects, in both material and metaphorical senses. For these groups, the difference between one type of mine and another is meaningless so long as both pose a threat to life and livelihood. Yet, such a difference, for example, between an Iranian copy of an Israeli No. 4 antipersonnel landmine and a Russian TM-57 antitank mine is, however significant for the mine clearance team tasked by the UN Mine Action Office to remove both types of mines in a contaminated area. As I will discuss in chapter two, some mine action groups will selectively "blackbox" mines/ERW in their discourse with target audiences as an exercise of power through "expertise" demonstrated with a variety of technologies. This raises the question, then, of whether the affordances of the technologies employed in mine action- as well as the arguments deployed about these technologies – are sufficient to win assent from those who are intended to be the recipients of the technologies.

To unpack and delineate such issues, I utilize Michelle Murphy's

[56] Bruno Latour, "A Collective of Humans and Nonhumans: Following Daedalus's Labyrinth," in *Pandora's Hope: Essays on the Reality of Science Studies* (Cambridge: Harvard University Press, 1999), 183.

concept of a *regime of (im)perceptibility*.[57] As noted earlier, Murphy defines such a regime as "the way a discipline or epistemological tradition perceives and does not perceive the world." The conjunction of perceiving and not perceiving rests on the fact that defining what is perceptible and "real" necessarily dictates what is imperceptible and "unreal" (hence the usage of "(im).") In articulating the regimes of perceptibility of women workers in postwar office buildings, scientific experts, and others, Murphy pays particular attention to historical and material interactions within specific environments by her various actors, framing the "arrangement of discourses, objects, practices, and subject positions that work together within a particular discipline or knowledge tradition" as an *assemblage* that creates a regime of perceptibility.

According to Murphy, not only is the way in which social groups view things and phenomena heterogeneous, but what those groups reconcile is equally multiplicitious, "composed of many histories, of 'ands,' that link in ways intended and unintended, drawing out some attributes and not others, thereby setting the conditions of possibility" for what is observed."[58] This is Murphy's expansion of earlier work in the history and philosophy of science which focused on historical

[57] Murphy, *Sick Building Syndrome and the Problem of Uncertainty*, 10.

[58] Ibid., 14.

ontology: how objects of technoscientific inquiry became recognizable in contingent contexts. Murphy's expansion moves beyond descriptive and historical levels of analysis into contemporary politics and activism.

Thus, in a similar vein, there are thematic similarities between Murphy's chronicling of women workers contending with scientific experts about chemical exposures and Sudanese and foreigners struggling to clear hidden mines/ERW as rapidly and cost-effectively as possible. In Sudan, my actors work to make mines/ERW not just visible to human eyes but also a concept that other people, experts and laity alike, can define and understand in their own ways.[59]

A key element of regimes of perceptibility that is readily applicable to this dissertation is Murphy's attentiveness to materiality and bringing material matter into being, both of which are deliberate exercises of power. Such attentiveness to material things is neither a rejection of social construction nor a move to essentialize an object's qualities. Rather, it is Murphy's emphasis that power's effects emerge from how individuals and groups organize "objects, actions, and subjects" and not just through the "realm of the discursive."[60] Moreover, "regimes of perceptibility" accentuates the tension in what

[59] Ibid., 5.

[60] Ibid., 181.

different actors see and do not – or *cannot* – see within a given physical and historical context.

I draw on Murphy's scholarship to articulate two primary regimes of perceptibility at work across mine action in Sudan: one I term the "clearance-oriented regime" and the other the "activist-oriented regime." The clearance-oriented regime is rooted in mine action's early history and approach of military techniques to clear mines/ERW in combat or wartime that were then applied to humanitarian efforts to remove mines/ERW that threaten civilians post-conflict. Clearance-oriented actors generally valorize "technical" interventions, which they define as involving technologies like metal detectors and armored machinery, as the only effective way to address mines/ERW. The activist-oriented regime emerges from mine action's later emergence as a global advocacy movement in the 1990s. Activist-oriented actors focus less on actual mines/ERW in the ground and more on the social and economic impacts these explosives may have on people by being present in the land people use.

Actors working in both regimes situate themselves squarely within the field of mine action, but there is a critical distinction in how they relate to and utilize local knowledge in producing broader knowledge about mines/ERW. The activist-oriented regime readily black-boxes mines/ERW, in that mines/ERW are simplistically

reduced to being threats to be avoided. The specifications, history, and complexities inherent to these explosives remain unspoken and avoided, and mine action groups under this regime successfully engage with local Sudanese communities to do the same. On the other hand, mine action work under the clearance-oriented regime does not black-box the mines/ERW that may be present in the environment, as the types, location, and knowable lifespan of mines/ERW are all relevant to their removal and destruction. Conversely, local knowledge about mines/ERW perceived to be in the area is taken by clearance-oriented actors is far less useful than what these actors discern for themselves about the mines/ERW in the ground.

Indeed, science and technology studies scholars have long been attentive to how material objects – human created or not –*become* objects of inquiry and the focus of attention. In one particularly illustrative example, Bruno Latour analyzes successive steps in the construction of technoscientific knowledge during a field expedition in the Amazon by composing what he termed a "photo-philosophical montage."[61] The following passage captures Latour's argument:

> In the naturalist's collection, things happen to plants that have never occurred since the dawn of the world. The plants find themselves detached, separated, preserved, classified, and tagged. They are then reassembled, reunited, redistributed according to entirely new principles that depend on the

[61] Bruno Latour, "The 'Pedofil' of Boa Vista: A Photo-Philosophical Montage," *Common Knowledge* 4, no. 1 (1995): 145–187.

> researcher, on botany that has been standardized for centuries, and on the institution that shelters them, but they no longer grow as they did in the great forest. The botanist learns new things and she is transformed accordingly, but the plants are transformed also. From this point of view, there is no difference between observation and experience: both are constructions.[62]

At first glance, the contexts of pedology – soil study – and mine action may have only cursory similarities in dealing with the ground beneath our feet. Yet, the ways that mine action actors survey communities and their land, organize standardized reports removed from their local contexts, and transform these data into charts and graphs in PowerPoint slideshows all reflect the litany of constructions that Latour lists. Upon all of these activities and choices made by mine action actors and organizations, "the most incomprehensible thing in the world would be for the [perceived mine] pattern [or any contaminated area] to remain incomprehensible after such rearrangements."[63] In other words, Sudan's contaminated landscapes are orderly to those who create such an order, and such ordering is done in specific ways. Moreover, the landscape makes sense because surveyors and other mine action officials have organized it as to make it "legible"[64] and in accordance with a particular worldview and perspective.

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[62] Ibid., 154–155.

[63] Ibid., 167.

[64] James Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven: Yale University Press, 1998), 2–3.

Not surprisingly, constructing technoscientific knowledge about a "new" landscape inevitably produces new politics that come up against existing political realities. This is especially true in a postcolonial nation with a large multinational peacekeeping presence within its borders. Richard Rottenburg provides a powerful illustration of such realities emerging from Sudan's recent history and current situation in what he terms a "therapeutic domination hypothesis." The hypothesis draws on three features of contemporary geopolitics which Rottenburg identifies as follows:

> change in the objects and functions of 'neoliberal' governance; the rise of so-called 'dysfunctional' states on the African continent and the internal forms of violent conflict that have been caused by and have caused their so-called 'failure'…and the world-wide success of universalist discourses of human rights, now with specific foci on public health and welfare.[65]

These changes in geopolitics and the setting in which countries and institutions interact creates a space for a field like mine action to become established in a country like Sudan. These features are in descending order of prominence in mine action discourse, and following the therapeutic domination hypothesis precede how mine action discourse frames people – in this case, Sudanese civilians –

[65] S. Seth, "Putting Knowledge in Its Place: Science, Colonialism, and the Postcolonial," *Postcolonial Studies* 12, no. 4 (2009): 382; Richard Rottenburg, "Social and Public Experiments and New Figurations of Science and Politics in Postcolonial Africa," *Postcolonial Studies* 12, no. 4 (2009): 423–440.

primarily as victims of war who require an outsider's urgent rescue.[66] Rottenburg's point on universalist discourses of human rights is instantiated in Sudan's contaminated landscapes in the standardization of impacted communities through mine action's technologies. Yet the human rights discourse belies the notion some mine action actors from affluent nations hold that Sudan's disastrous civil wars justify further international intervention. What qualifies some expatriate mine action actors to hold management positions in both offices and field sites is a tacit understanding that mine action experience elsewhere is applicable to Sudan. In other words, these actors maintain that the technical knowledge of clearing mines/ERW can travel as seamlessly as a light blue UN passport. Such a claim poses the question, though, of how readily such technical knowledge is taken up in different contexts.

Rottenburg's point on how emergencies can entail exceptions is one emphasized by other global anthropologists, notably Didier Fassin and Mariella Pandolfi. They make the case that

> during the 1970s and 1980s…a new paradigm was gradually being put in place, a paradigm that asserted the right to intervene – or at least allowed it to prevail over the respect of sovereignty – in the name of lives to be saved and populations to be protected. This paradigm is what we propose to call the 'military and humanitarian government' of the world. Thus, contemporary interventionism is new in that it is legitimized in

[66] Rottenburg, "Social and Public Experiments and New Figurations of Science and Politics in Postcolonial Africa," 425.

> terms of a moral obligation, rather than a political principle – or more precisely (for morality has always had a place in the justification of war), it is new in that the politics of military intervention are now played out in the name of humanitarian morality.[67]

While Fassin and Pandolfi use examples such as the Indian-Pakistani conflict and the creation of Bangladesh as well as NATO intervention in Kosovo to make their argument, their point has applicability to the UN Mission in Sudan and its constitutive UN Mine Action Office. The government of Sudan has largely been successful at preventing other countries and the UN from waging its campaign against individuals and groups it deems to be enemies. While UNMIS was indeed staffed with 10,000 peacekeeping soldiers from across the world, the mission has never acted as forceful deterrent. No external power held a gun to a north Sudanese soldier. There has never been a no-fly zone created to stop the north's aerial bombers (which are deliberately painted the same shade of white as the planes the UN uses for food drops). On one hand, the legacies of colonialism and foreign interventions partly motivate the government's resistance efforts. At the same time, the government of Sudan does not want its violent, iron-fisted suppression challenged or impeded. Such considerations along with the perceived threat and harm of mines/ERW brings about the fact that "of course,

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[67] Didier Fassin and Mariella Pandolfi, "Introduction: Military and Humanitarian Government in the Age of Intervention," in *Contemporary States of Emergency: The Politics of Military and Humanitarian Interventions*, ed. Didier Fassin and Mariella Pandolfi (New York: Zone Books, 2010), 12.

aid workers on the ground often know that more is involved and are often aware that immediate emergencies have histories…nonetheless, the very idea of the emergency emphasizes the immediacy of each occurrence and derives a significant part of its capacity to command attention and mobilize resources from this sense of immediacy."[68]

STS and postcolonial scholars are attentive to such "functional" ahistoricity, and as historian of science Suman Seth notes

> representations of the (West's) past are crucial to development discourse, for they prove that 'progress has, in fact, taken place.' The 'developed' West, that is, has been where 'underdeveloped' nations are now and hence is the source of information on how to proceed to a developed future. That past, however, is almost always put forward as a depoliticised one, presented 'in the "measured tones" of the "stylized facts" of economic abstraction.' Yet the very political present of development's current effects serves to open up for inspection the violence that made the West's development possible at all.[69]

There is indeed a strong current of the global West/North's representation of itself to Sudan in mine action. Mine action actors tend to tell stories to themselves and lay audiences along these lines: "Look at Europe after World War II. The whole place was littered with mines and unexploded ordnance. But they focused on cleaning it up and got most of the job done." What is not mentioned, however, is that much of the clearance in Europe was done by forced prisoner of war

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[68] Fassin Calhoun, "The Idea of Emergency: Humanitarian Action and Global (Dis)Order," in *Contemporary States of Emergency: The Politics of Military and Humanitarian Interventions*, ed. Didier Fassin and Mariella Pandolfi (New York: Zone Books, 2010), 46.

[69] Seth, "Putting Knowledge in Its Place," 377.

labor. Moreover, despite the hundreds of millions of mines deployed and subsequently cleared over vast amounts of land, "perhaps the most surprising aspect was that the post-war demining experience did not result in the development of more efficient equipment or procedures."[70]

At the same time, many mine-action actors cite Europe as proof against the mine-free standard; that is, Sudan cannot reasonably expect to be mine-free if countries in western Europe still periodically experience mine/ERW accidents. If western Europe is still contending with mines/ERW more than half a century postwar, Sudan will have to find ways to manage its own mines/ERW in the decades to come as no donor nation will provide 50 years of foreign assistance to Sudan. Moreover, through local law enforcement and military Europe has the standing capacity to defuse situations of mines/ERW being uncovered, a capacity that Sudan lacks but is ostensibly "developing" with international/foreign assistance. Seth's conclusion that "new forms of unequal power-knowledge are co-produced…(in) international 'crises' in health and environment" [71] points to an opening to examine the regimes of perceptibility that facilitate such production of power.

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[70] Sadly, this historical point contrasts with the fact that "considerable investment was poured into the development of new generations of mines incorporating the latest technology," Croll, *Landmines in War and Peace*, 100.

[71] Seth, "Putting Knowledge in Its Place," 379–380.

Methods and Nota Bene

I conducted the research that forms the basis of this dissertation as a participant observer with the United Nations Mine Action Office in Sudan from November 2010 through May 2011. Following an initial visit to Sudan in October 2009, I approached the UN Mine Action Service office in New York City with my dissertation proposal in early 2010, and they were sufficiently interested in what I wanted to study to offer logistical support (all research expenses were supported by other sources, primarily the National Science Foundation). I experienced a considerable amount of bureaucratic delay between reaching an agreement with the UN Mine Action Service and actually arriving in Sudan, although the UN was ultimately able to facilitate obtaining an entry visa into Sudan and a residence permit from the Sudanese government once I was in the country.

Before departing for Sudan, I conducted interviews with mine action officials at their offices in the United States and Europe and at two international mine action symposia. In addition to the interviews themselves, many of the people I interviewed directed me to important mine action documents and literature. This material not only helped me situate the interviewees but also partially prepared me for my time with the UN Mission in Sudan.[72]

[72] Upon my return from Sudan and before returning to Cornell, I spent 14 weeks as an intern at the U.S. State Department's Office of Weapons Removal and Abatement.

Once "on the ground," an official affiliation with the UN provided me with a UN identification badge, driver's license, and access to a Land Cruiser. Additionally, I had logistical and emergency support and could travel around the country to spend time near and in minefields and dangerous areas without having to apply for travel permits from the Sudanese government (the government of Sudan required foreign nationals not affiliated with the UN to secure permits to move across the country). I also spent a significant amount of time assisting with various desk operations and used these opportunities to engage with national and expatriate UN Mine Action Office staff.

In exchange for UNMAO's access and support, I assisted with some of the office's operations, both in the headquarters office in Khartoum and in the field offices across the country. While some of the tasks I completed were administrative (e.g. compiling information for record keeping), others were more "practical," such as assisting quality assurance monitoring of clearance and mine-risk education organizations and supporting mine/ERW accident investigations.

Throughout my time in Sudan, I was subject to UN curfews (no

This office is the U.S. government's primary point of contact for mine action, providing nearly US$2 billion since 1993 for mine/ERW clearance, mine-risk education, victims assistance, and physical security and stockpile management of foreign governments' arsenals. While I did not work directly on Sudan as an intern (the American financial contribution to Sudan's overall mine action efforts is a relatively small percentage, and the office's staffing requirements were in a period of transition), the internship was an immensely positive experience that illustrated the paradox of the current U.S. position of not signing the Mine Ban Treaty while still being a globally leading donor nation.

travel after sunset and limited overnight stays in the field) and security restrictions (all travel must be pre-authorized, and no access to Darfur and Abyei under UN security regulations because of the volatile situation of armed groups active in those areas and periodic attacks on UN and NGO personnel). Once in the country, for better and for worse, it was clear to almost everyone I encountered that I was a part of the peacekeeping mission, which arguably changed how others interacted with me. During the six-year Comprehensive Peace Agreement period from 2005 to July 2011, the UN peacekeeping mission was staffed with thousands of international civilians. On one encounter with a landmine survivor, my UN identity produced a strong negative reaction, as the survivor perceived all UN staff to be aligned with Northern Sudanese national authorities (the UN's peacekeeping mission in the country required formal permission from the government of Sudan).

In this dissertation, I use "UN" and "UNMAO" seemingly interchangeably. UNMAO is clearly part of the UN, but there are times when the office's actions and decisions are not so much a decision by the whole United Nations as it is by one office. While UN decisions affect UNMAO, the converse is not always the case, even though UNMAO ostensibly represents the UN. Some of the office's actions as a specific mine action organization are limited to mine action and not all

of the UN's activities and domains of engagement.

Photographs are a key component of my dissertation, and I was consistently aware of my (invisible) presence within the space of action being represented. STS has a long and rich tradition recognizing and deconstructing that such photographs enable virtual witnessing,[73] at the expense of allowing the people in the images to protest or speak. I rely on my field experiences and interactions with those represented that what I present is ultimately consistent with my actors.

A road map

I structure my dissertation by focusing on three key mine action efforts: socio-economic surveying, mine-risk education, and clearance. While each of these chapters makes a specific point about a particular mine action activity, they also speak to the larger argument about how mine action groups work within the activist-oriented or clearance-oriented regime of perceptibility which subsequently establishes what these groups see and do not see as a part of their efforts in Sudan's contaminated landscapes.

In chapter one, I discuss two different approaches and methodologies for surveying mine/ERW-affected areas which are a source of conflict between different mine action organizations. Beyond

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[73] Steven Shapin, "Pump and Circumstance: Robert Boyle's Literary Technology," *Social Studies of Science* 14, no. 4 (November 1, 1984): 481 –520.

a difference of expert judgments, these different approaches emerged from divergent histories within the establishment of mine action.

I further articulate in chapter two how the clearance-oriented regime actively maintains and circumscribes others by drawing on its position of authority and laying claim to mine action expertise. The case of mine-risk education organizations and their efforts illustrates how expertise, authority, and power are created and dynamic, not inherent and static.

Chapter three centers on mine/ERW clearance, the largest dimension of mine action, in terms of longest history, amount of funds, and attention within and outside the field. By the way clearance organizations and oriented actors are able to normalize accidents, I show that the regime of perceptibility for this community can obscure contingencies and nature's agency.

The conclusion looks at the state of the Sudans after South Sudan's independence and the resumption of hostilities between the North and South shortly after the latter's independence in July 2011. To varying degrees, mine action activities continue across the two countries, and I close with what this dissertation offers to STS and policy and decision makers who work in mine action.

In their now classic text Leviathan and the Air-Pump, Steven Shapin and Simon Schaffer made the point that in analyzing

competing and distinct knowledge claims, "we need to *play* the stranger, not to *be* the stranger" (emphasis in original).[74] In playing a stranger and seeking to understand the various interactions between relevant social groups and consequences of those interactions, it is my goal to present clearly an account of complex and multifaceted actors. Using regimes of perceptibility as a conceptual tool allows me to trace how seemingly conflicting aspects of mine action co-exist. This tool counters the potential to cast my actors in black and white one-dimensional terms and enables me to articulate how actors change over time, even short periods.[75]

[74] Steven Shapin and Simon Schaffer, *Leviathan and the Air-Pump: Hobbes, Boyle, and the Experimental Life* (Princeton: Princeton University Press, 1985), 6.

[75] Mark Lawrence, "Myth, Memory, and Manipulation: JFK and the Developing World" (Seminar presented at the Judith Reppy Institute for Peace and Conflict Studies, Cornell University, Uris Hall, April 12, 2012), http://peaceprogram.einaudi.cornell.edu/calendar/index.asp?date=4/12/2012.

CHAPTER 1: SURVEYING THE SOCIO-ECONOMIC IMPACTS OF MINES/ERW

"In sum, the role of survey is perhaps the most challenging and most critically debated aspect of mine action."[1]

Introduction

Given the histories of Sudan and mine action, the 2002 ceasefire between the North and South presented the mine action community – and the international humanitarian community writ large – with an opportunity for access. A respite in one of the most infamous conflicts on the African continent was not to be missed, and UN-funded mine clearance commenced almost immediately. The response by the mine action community reflects a pattern common to other humanitarian endeavors in which many of the practitioners in the field see the priorities of action and planning as structurally opposed: "do you want to talk, or do you want to *do* something about it?" Moreover, mine action in Sudan and elsewhere has largely conducted "rapid response" clearance, while simultaneously or subsequently conducting detailed surveys.

Such "rapid responses" were a part of the UN's first mine action efforts in Sudan which prioritized clearing roads of mines/ERW to

[1] Geneva International Centre for Humanitarian Demining, *A Study of the Role of Survey in Mine Action* (Geneva: Geneva International Centre for Humanitarian Demining, March 2006), 2.

facilitate humanitarian aid delivery. The 2005 Comprehensive Peace Agreement moved Sudan from temporary ceasefire to peace and simultaneously initiated the UN's peacekeeping Mission in Sudan with a key part of the mission being the establishment of the UN Mine Action Office (UNMAO).

One of the new office's first efforts was to contract a nationwide Landmine Impact Survey (LIS) from the Survey Action Center, a major American-based NGO in mine action based in Takoma Park, Maryland. A LIS is a survey of communities in a country which report whether mines/explosive remnants of war (ERW) affect their lives and livelihoods by counting the number of recent victims and noting blocked access to socio-economic resources such as water, farmland, or schools. Survey Action Center had conducted 16 other LIS's of mine/ERW-affected countries between 1999 and 2005.

After the "emergency phase" mode of mine action operations in Sudan between 2002-2005 before formal peace was established, the LIS provided an opportunity to measure the extent of the country's mine/ERW contamination. Additionally, the UN used the context of a mine/ERW emergency to justify mine/ERW clearance of roads and areas known to have had heavy conflict prior to establishing a national baseline. Early UN estimates of 500,000 to 2 million mines located mostly in the South were overshadowed by the Sudanese government's

claims of 2 to 3 million mines/ERW over 800,000 square kilometers, approximately a third of the country's land area.[2] Whether or not the UN, mine action organizations, or international donors were persuaded by these figures, the need for more information was one concern that all stakeholders shared. Such information could facilitate UN peacekeeping mission planning as well as provide donors with an idea of how much financial support UNMAO would require for its work. Unsubstantiated estimates might encourage larger contributions, but it could also discourage donors from engaging with an issue they deemed to be too large and unfeasible to solve. Thus, there was an undefined line between conveying accurately the extent and therefore the importance of the mine/ERW problem while being cognizant that too large a figure might overwhelm requests to potential donors.[3]

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[2] International Campaign to Ban Landmines, "Sudan," in *Landmine Monitor Report 1999: Toward a Mine-Free World* (Ottawa: Mines Action Canada, 1999), http://www.the-monitor.org/index.php/publications/display?act=submit&pqs_year=1999&pqs_type=lm&pqs_report=sudan&pqs_section=.

[3] This concern is related to economic concerns of rent-seeking, understood as "all of the various ways by which individuals or groups lobby…for taxing, spending and regulatory policies that confer financial benefits or other special advantages upon them at the expense of the taxpayers or of consumers or of other groups or individuals with which the beneficiaries may be in economic competition." Paul M. Johnson, "Rent-seeking Behavior," *A Glossary of Political Economy Terms*, 2005, http://www.auburn.edu/~johnspm/gloss/rent-seeking_behavior. For a discussion of rent-seeking in mine action, see Bolton, *Foreign Aid and Landmine Clearance*, 43. During the 1990s, the UN overstated – arguably intentionally – figures and projections of HIV/AIDS transmission and infection rates in part to generate financial support for its efforts. See Craig Timberg and Daniel Halperin, *Tinderbox: How the West Sparked the AIDS Epidemic and How the World Can Finally Overcome It* (New Haven: Penguin, 2012), chap. 16.

UNMAO had funded international NGOs and commercial firms for surveys across Sudan, but these surveys focused only on roads or certain regions of the country. The LIS was the only nationwide survey conducted and, as I discuss below, was a qualitatively different survey from previous efforts. From its initial planning to the management team's departure, the survey began in August 2005 and ended in July 2009 at cost of US$4.3 million. Despite the fact that UNMAO contracted the LIS and had a direct role in the survey process, the office and many other mine action groups in Sudan perceive the data from the survey as inadequate and problematic at best.[4]

I argue in this chapter that the limited acceptance and use of the LIS is the result of competing regimes of perceptibility – an activist-oriented regime and a clearance-oriented regime – which simultaneously direct mine action towards divergent end goals. The role of surveys in mine action is contested among key stakeholders in part because of the perspectives of the various groups that came together in mine action's early history. Whereas early mine action focused on expanding military techniques to clear mines for civilian

[4] Geneva International Centre for Humanitarian Demining, *A Guide to Land Release: Technical Methods* (Geneva: Geneva International Centre for Humanitarian Demining, April 2011). The results of Landmine Impact Surveys have led UNMAO, GICHD, and other prominent groups in mine action to codify and adopt a policy of "land release" (discussed further in chapter 5). See Geneva International Centre for Humanitarian Demining, *A Guide to Land Release: Non-technical Methods*, 2nd ed. (Geneva: Geneva International Centre for Humanitarian Demining, 2008), http://www.gichd.org/publications/subject/land-release/a-guide-to-land-release-non-technical-methods-2.

aid, the field later expanded its focus to the communities affected by mines. While some advocates of the LIS claim the critiques of the survey are the result of limited resources allocated to the survey process, I show that the thrust of LIS criticisms is couched in competing conceptions of objectivity. This clash emerges from how the LIS rests uneasily between two regimes of perceptibility and thus comes to represent the tensions between them.

The survey itself is an explicit quantifying metric by a professionalized discipline, and *what* is being quantified creates tension within other parts of mine action and UNMAO. The metrics employ number of mines, area of land contaminated, or numbers of people and communities impacted. Each of these elements begins a path dependency with particular political entailments. In other words, the objects and figures of interest in mine action surveys have political consequences. Such consequences lead the various groups within the mine action community to argue over which of those objects and figures ought to be the center of the survey. Geographer Charles Mather points to the cadastral politics of surveys in mine action as "an attempt to shift decisionmaking and priority setting from local methods used by NGOs to 'objective' and rational techniques championed by UNMAS."[5] In this shifting process, the "local" opposes

[5] C Mather, "Maps, Measurements, and Landmines: The Global Landmines Crisis and the Politics of Development," *Environment and Planning A* 34 (2002): 239–240.

"objectivity" which has a universal appeal evident to all except those living with mine/ERW contamination. The LIS's place in mine action reveals a contestation among mine action stakeholders over what kinds of objectivity are necessary for their respective visions of effective mine action.

In this chapter, I develop the terms "activist-oriented regime" and "clearance-oriented regime" to distinguish between different approaches to mine action. The "activist-oriented regime" centers on actors whose involvement in mine action emerged from the period in the 1990s when they organized to advocate for the Mine Ban Treaty. I designate them as "activist-oriented" because of their self-described activism, which eventually led to nation states to acquiesce to their calls for a landmine ban. "Clearance-oriented regime" refers to the way some actors frame mine/ERW issues based on their direct experience on the ground clearing these explosives and/or managing such operations. While these terms are blunt and inevitably reductionistic, they nonetheless capture the different histories of mine action and how such histories form an assemblage to shape the different regimes of perceptibility at work. In this chapter, I trace the development of surveys in mine action, describe the LIS process in Sudan, and analyze the LIS results from the perspective of the two different

regimes in order to highlight what each regime can perceive and subsequently respond to across the environment.

An Overview of Impact Surveying

"Following the signing of the Mine Ban Treaty in Ottawa in December 1997, it became very clear that the scope and impact of the worldwide landmine problem needed to be defined and quantified."[6]

Throughout the growth of mine action as a large-scale humanitarian aid effort, the development of surveying and surveying technologies took different forms in response to contingencies such as geographical location, organizations' institutional practices, number of personnel and a wide range of other factors, all shaping the history of mine action surveying. What initially began with two British NGOs established by former military personnel in Afghanistan grew to include several other organizations conducting mine action operations across the world. Surveying in Sudan began 15 years into the development of global mine action standards and practices, and I will delineate the salient ones here.

When mine action began in Afghanistan in the late 1980s, the first steps of removing and clearing mines/ERW from a suspected or known contaminated area were a well-intentioned response to a dangerous situation. Shortly after clearance activities began, however,

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[6] Survey Action Center, "About Us - Overview," 2004, http://www.sac-na.org/sac_overview.html.

conducting surveys to define which areas needed to be cleared of mines/ERW became a distinct activity within mine action. In other words, the emergence of survey as a standard part of mine action followed from clearance being established as the first mine action activity and the subsequent prioritization of clearance as a mine action intervention.

It would not be until March 1997, when the United Nations issued the first International Standards for Humanitarian Mine Clearance Operations, that survey (along with other components of mine/ERW clearance) became codified and distinguished between different levels of survey: Level One (general) survey; Level Two (technical) survey; and Level Three (completion) survey. A Level One survey establishes general locations of suspected or mined areas by interviewing the local population. A Level Two survey delineates the perimeter of minefields using clearance technologies (viz. human deminers, mine detection dogs, or armored machines that plough the ground, all discussed in further detail in chapter 3). A Level Three survey recorded the precise areas that clearance teams cleared, and unlike the first two levels, this survey is retrospective in nature.

These surveys focused on finding mines/ERW to facilitate assessments of how mine/ERW-contaminated a country was. Prior to Landmine Impact Surveys becoming established in mine action, three

notable surveys made an explicit alternative effort to examine how mines/ERW not only threaten people's bodies but their lives and livelihoods as well. These surveys were Mines Advisory Group's *The Report of the Afghanistan Mine Survey* (1991), Handicap International's *Living with UXO in Laos* (1997), and Afghanistan's Mine Clearance Planning Agency and UN Office for the Coordinator of Humanitarian Affairs' *Socio-Economic Impact Study of Landmines & Mine Action* (1999).

The efforts of mine action surveyors in the 1990s to focus on socio-economic impacts drew from survey approaches utilized in rural community development and public health rapid assessments in the 1980s, assessments that hitherto had largely escaped the attention of early mine action professionals.[7] One critical result of mine action surveyors drawing from these other survey methodologies is that mine action professionals expanded their perception of mines/ERW. The sheer quantity of mines/ERW did not necessarily positively correlate with or directly cause negative impacts on a community. One key implication was that helping the greatest number of people could trump clearing the most mines. A more general point was the focus of these surveys shifted from a technical perspective that focused on

[7] For a detailed history of surveying in mine action see Geneva International Centre for Humanitarian Demining, *A Study of the Role of Survey in Mine Action*, particularly chapter 1.

material mines/ERW to a socio-technical perspective that included the community and environment surrounding the explosive objects. This is not to imply that one approach to mine action is more "humanitarian" than the other, but instead illustrates how seemingly common terminology and invocation of a widely recognized goal of "surveying" requires an active constructive effort towards definition and enactment of exactly what work is done.

Perhaps with some degree of irony, these earlier rapid assessments grew from critiques of large quantitative surveys that sought precise information that ultimately failed to provide surveyors with actionable information. Such large quantitative surveys were extrapolated from field visits that obtained superficial information from individuals who were readily available and willing to talk with outsiders. While such informants may make the task of surveying easier, they offer a very limited and particular perspective. Furthermore, such surveys are also susceptible to other "distortions," which surveyors and standard-setters acknowledge, such as the limits of knowledge from the local community, which may be newly resettled, and group interactions where existing power structures mediate the given knowledge. Moreover, there is also the possibility of an affirmation bias: participants may provide answers they think surveyors want to hear. The additional irony is that all of these

concerns are potentially applicable to the socio-economic mine action surveys which were introduced later.

While socio-economic impact surveys, and consequently, socio-economic impacts were not the primary focus of mine action during the field's formative stages, the Mine Ban Treaty in 1997 brought mine/ERW-affected communities into the forefront of mine action. The goal of the treaty was not just to clear mines/ERW that pose a hazard to people, but to help people by clearing mines/ERW. In other words, not all minefields impact people, and not all mines have the same level of impact. Developing this point even further, a mine need not be physically present to affect an individual or community's behavior. If someone or a group of people think mines/ERW are present in an area, there is the high probability that the land will be avoided and lie unused.

To quantify which people, where, and how many were being affected by landmines, UNMAS, GICHD, and several of the early humanitarian NGOs with mines/ERW experience formed the Survey Working Group (SWG) in May 1998. SWG's objective is "to facilitate the prioritizing of human, material and financial resources supporting humanitarian mine action at the national, regional and global level through the completion of Level One Mine/UXO Survey."[8] SWG

[8] Landmine Monitor, *Global Landmine Survey Programme*, 1999, http://www.the-monitor.org/index.php/publications/display?url=lm/1999/appendices/gls.html.

initially set out to conduct Level One surveys in other known mine/ERW affected countries; however, SWG felt that the recent shifts towards socio-economic impacts from the perspective of mine/ERW affected communities left Level One surveys and their focus on generalized descriptions of mine/ERW locations "antiquated."[9] Thus began SWG's efforts to develop a new type of mine action survey that would eventually be spearheaded and overseen by the Survey Action Center.

To establish the Landmine Impact Survey as an instrument for mine action information gathering, SWG established and approved a series of protocols to conduct the LIS.[10] These protocols govern the structure and sequence of an LIS in a specific country, and have been expanded and modified by SWG over time. It is worth noting the variable length of these protocols suggests what dimensions of surveying SWG considers most important or least desired to be left to individual interpretation and ad-hoc implementation. Of the ten protocols in place during the Sudan LIS, eight of them are approximately ten pages long. The protocol for data analysis is fifty-four pages, the majority of which contain an overview, conceptual considerations, and an operating manual for how data is to be

[9] Robert Eaton Interview by Benjamin Wang, Takoma Park, MD, February 17, 2010.

[10] Survey Action Center, "Resources - LIS Protocols," accessed March 7, 2010, http://www.sac-na.org/resources_lisprotocols.html.

analyzed, drawing from examples from completed LISs. The protocol for minimum data requirements and questionnaire stretches to one hundred forty-two pages, detailing all of the information which LIS surveyors must gather.

This protocol also includes an annotated questionnaire that serves as a template for an LIS. The questionnaire is predominantly focused on local information and knowledge from interviewed communities, only some of which surveyors and team managers can verify and cross-reference, such as the economic base of the area or the intensity of conflict. Other data will also primarily come from the surveyed community itself. In response to other non-mine action community surveys, the LIS sought to engage with communities regardless of population size. Despite local communities generally lacking mine action expertise or an understanding of military strategy, LIS protocols instruct surveyors to accept a community's information as likely to be accurate. While surveyors give local communities full credibility, the surveyors also recognize the limits of local perspectives by using multiple sources such as national and local authorities or any existing military records.

Some mine action actors call such community-based information as "non-technical." Rae McGrath, co-founder of Mines Advisory Group, makes this point about Level One surveys, and it is

arguably also applicable to the LIS. McGrath begins with terminology rejecting the term "survey" in favor of "assessment" for Level One or Impact information. The difference is in connotation, and arguably, primacy: "it is unfortunate that the Level One process has been termed 'survey', which tends, among some non-specialist circles, to suggest a technical content [types of mines/ERW, locations, possible purpose during combat, etc.] whereas the emphasis is actually on socio-economic based assessment [which are based on community impacts rather than the material explosive]. The two processes are linked, but Level One assessments offer no substantial or reliable prime data for the purposes of designing wide scale eradication programmes."[11] McGrath's point speaks to a persistent issue within mine action about establishing "technical" expertise. "Technical" expertise rests, however, on the power to define mines/ERW as either "technical" or "socio-economic," and those "experts" who set such definitions put "technical" and "socio-economic" rhetorically far apart from each other.

Even as Survey Action Center developed specific methodologies for the LIS – which the organization frames as a professionalizing measure to introduce quantification as an appeal to rational objectivity[12] – the efforts to turn such community-based surveys into a

[11] McGrath, *Landmines and Unexploded Ordnance*, 87.

[12] Geneva International Centre for Humanitarian Demining, *A Study of the Role of Survey in Mine Action*, 12. Landmine Impact Surveys have three explicit objectives:

technocratic process maintained the shift in surveying from the material mines/ERW to the socio-economic impact caused by such explosives. At the same time, invoking quantification is a move to standardize mine/ERW-affected communities across the world, a move necessitated by the tensions arising from the scarcity of resources. More specifically, international donors demand a level of efficiency with their financial aid and calculating such efficiency requires a degree of "universal" quantification.[13]

In light of such demands, SAC intended the development of LIS protocols and standards to help local communities and be cost-effective to donors. Yet, such methodologies are inherently active exercises of power by mine action organizations. Surveying casts a new light on how communities manage the threat and/or presence of explosives on their land. Groups like SAC do not necessarily view their methodologies as deliberate acts of power. Yet setting standards for how communities in other countries are to be classified does demonstrate SAC's ability to structure the survey process with vast

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"(a) define the scale and socio-economic impact of landmine contamination, (b) provide a reliable national database to be used in future mine action planning and priority setting to address impact, and (c) establish baseline data for measuring overall performance of mine action programmes individually and worldwide."

[13] Geneva International Centre for Humanitarian Demining, *A Guide to Mine Action - Edition 2010* (Geneva: Geneva International Centre for Humanitarian Demining, 2010), 214, http://www.gichd.org/publications/a-guide-to-mine-action. On this point, GICHD openly states "in the face of uncertainties arising from inadequate data and understanding, key actors such as the major donors and the national government are loath to delegate authority to any organisations or subordinates that they do not already trust."

implications on the ground. One concrete example is a community that reports being highly *impacted* by mines/ERW, but may not necessarily be a high *priority* for clearance (I discuss in detail how "high/low impact" and "high/low priority" are formulated and the political implications of such designations in the next section). One distinction between a *high impact* community and a *high priority* community is that a high impact community might have had numerous casualties from a bus hitting an antitank mine on a road, but such an accident might be framed as exceptional and not indicative of a wider problem, and thus viewed by operations as not being a high priority. Another distinction between "impact" and "priority" emerges from the fact that impact classification is independent of population. Thus, a high priority task of clearance in a community might affect a greater number of people than a smaller community that reports a higher impact.

This ability to designate a community as high impact or high priority rests in part on SAC's declaration of its authority based on its experience and expertise in mine action. However, one of the many challenges that emerged in 1999 with the first LIS of Yemen and continued through the LIS of Sudan in 2009 (the last LIS completed, to date) is keeping communities instead of minefields at the center of attention and concern. This shift began an on-going effort to redirect

mine action's focus and institutional aims. But such a shift does not come without cost, conflicting opinions, individual or institutional resistance.

This tension is not lost on mine action groups. Charles Downs, an adjunct professor of international public management at New York University and consultant to SAC and GICHD, writes in an assessment of mine action surveys, "depending on their roles, some stakeholders are more interested in some data than others – this is the source of many of the current debates and progress regarding mine action survey. To meet the different needs of various stakeholders, a national programme eventually requires all the information in the various types of surveys."[14]

Despite this call for more mine/ERW information – which might be more accurately described as mine/ERW information within different contexts – a Landmine Impact Survey, and particularly the Sudan Landmine Impact Survey, is laden with the expectation of definitively revealing the extent of the country's mine/ERW contamination. An article in the *Journal of ERW and Mine Action* from August 2006 (then called the *Journal of Mine Action*) describes the establishment of the Sudanese National Mine Action Authority. Written by Qadeem Khan Tariq, the UN Development Programme–

[14] Geneva International Centre for Humanitarian Demining, *A Study of the Role of Survey in Mine Action*, 7.

Sudan Senior Technical Advisor for Mine-Action Capacity Development, the article begins: "The Republic of Sudan is one of Africa's most heavily landmine/explosive-remnants-of-war-affected countries. The true extent of the landmine/ERW problem in Sudan largely remains unknown as a country-wide Impact Survey has just recently been initiated to measure both the scope and impact of the situation."[15] *Landmine Monitor*, the authoritative annual publication by the International Campaign to Ban Landmines, frames the LIS as being almost singularly authoritative, as no other surveys or methodologies across multiple mine/ERW-affected countries exist. After the Sudan LIS was completed in 2009, the top of the summary section in the 2009 *Landmine Monitor* states:

> Sudan is contaminated with mines and explosive remnants of war (ERW), primarily as a result of more than 20 years of armed struggle between the government of Sudan and non-state armed groups in the South, mainly the Sudan People's Liberation Movement/Army. A Landmine Impact Survey was completed in 16 Sudanese states in June 2009, with the UN Mine Action Office (UNMAS) estimating that total residual contamination covered 107 km^2.[16]

The LIS is the only survey listed in the top summary of the 2009

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[15] Qadeem Khan Tariq, "Sudan Launches National Mine Action Authority," *Journal of Mine Action* 10, no. 1 (August 2006), http://maic.jmu.edu/journal/10.1/focus/tariq/tariq.htm.

[16] International Campaign to Ban Landmines, "Sudan," in *Landmine Monitor Report 2009: Toward a Mine-Free World Annual Report* (Ottawa: Mines Action Canada, 2009), http://www.the-monitor.org/index.php/publications/display?act=submit&pqs_year=2009&pqs_type=lm&pqs_report=sudan&pqs_section=.

Landmine Monitor entry for Sudan, which is indicative of authority, if not the trust, ceded to the LIS by the major annual mine action publication.

In the section on Sudan's mine/ERW problem, the previous year's edition of *Landmine Monitor* states: "The precise extent of contamination remains unclear, with UN and national authorities previously estimating that 19 of 25 Sudanese states were contaminated. However, the Landmine Impact Survey (LIS), which is being conducted on a state-by-state basis, and a number of ad hoc assessments, have given a better indication of the problem."[17] It is worth noting the tension between the discourses of certainty and uncertainty: before the LIS's completion, the level of contamination is unknown to a large degree, yet the UN and national authorities estimated significant prevalence of mines/ERW.

What makes the *Landmine Monitor*'s acceptance of the authority of the Landmine Impact Survey particularly notable is that *Landmine Monitor* is written for both internal and external audiences. Perhaps the fact that non-experts will read such publications allows the LIS to be cast in such a way to satisfy demands for an answer to "How much mine/ERW contamination is there in Sudan?" What is also worth

[17] International Campaign to Ban Landmines, "Sudan," in *Landmine Monitor Report 2008: Toward a Mine-Free World Annual Report* (Ottawa: Mines Action Canada, 2008), http://www.the-monitor.org/index.php/publications/display?act=submit&pqs_year=2008&pqs_type=lm&pqs_report=sudan&pqs_section=.

noting is that the *Landmine Monitor*'s authority derives in part from the International Campaign to Ban Landmines's position as *the* unifying activist and advocacy organization in mine action. *Landmine Monitor*'s attentiveness to the LIS is in line with the larger goals of the ICBL. Once the LIS was established, *Landmine Monitor*'s authority over knowledge of mine/ERW contamination and impacts deferred to the survey.

Thus, the question "how much mine/ERW contamination is there in Sudan" allows for at least two different measurements of contamination, and, as discussed above, the LIS attempts to answer the question first in terms of communities and then by area. Furthermore, the way the LIS can be presented to both internal and external audiences exemplifies what Anya Zilberstein terms "empirical imprecision."[18] Because the LIS is an attempt to satisfy multiple demands and inquiries, the LIS maintains an intentional and persistent lack of precision, even given its extensive methodologies and protocols.

In the following section, I describe the processes by which SAC and its implementing partners conducted the Sudan LIS.

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[18] Anya Zilberstein, "An Inexact Science: The Natural History of Colonial Environments," in *Ways of Knowing, I* (presented at the Bringing STS into Environmental History, Trondheim, Norway, 2010), 3, http://sts-eh2010.miljohistorie.net/zilberstein/.

Conducting the Landmine Impact Survey

Prior to SAC's LIS, Sudan Landmine Response, a national NGO, conducted what was called a "mini-Landmine Impact Survey" of the Nuba Mountains area of South Kordofan state from 2003-2004. While the survey did identify communities that self-reported mine/ERW impacts, UNMAO did not include the results of the survey in its official database, Information Management System for Mine Action. UNMAO's exclusion was because "the data was thought to be rather general" and "further area reduction techniques are needed to better define the boundaries of a mined area."[19] This reasoning is notable as it points to an unstated level of specificity that UNMAO requires in surveys, even if those surveys rest on community reported impacts rather than mines/ERW and the amount of land over which mines/ERW are found.

In 2003 SAC conducted an advance survey mission after the civil war's ceasefire, during the period when the UN and national NGOs were conducting limited mine action activities. The mission established preliminary details that could affect the eventual execution of the survey, such as the availability of informative contacts, navigating dirt roads during annual rains, and other considerations

[19] International Campaign to Ban Landmines, "Sudan," in *Landmine Monitor Report 2006: Toward a Mine-Free World Annual Report* (Ottawa: Mines Action Canada, 2006), http://www.the-monitor.org/index.php/publications/display?act=submit&pqs_year=2006&pqs_type=lm&pqs_report=sudan&pqs_section=.

and constraints. Within a year of the January 2005 Comprehensive Peace Agreement, SAC signed a memorandum of understanding with Sudanese and South Sudanese authorities, and by March 2006 SAC established its infrastructure and logistics to survey Eastern Equatoria state in South Sudan.

The LIS was slated to survey nineteen of Sudan's twenty-five states; the six excluded states were far from the conflict and thus not included (although there are occasional reports of World War II-era ERW being found in those states).[20] The LIS survey teams for sixteen of the nineteen states were contracted from Mines Advisory Group, one state was surveyed by Handicap International, and SAC surveyed the two remaining states. A state-by-state approach, various organizations working in different parts of the country, and donor funding mechanisms all contributed to SAC working with multiple implementing partners to produce the survey.

Once SAC established a presence in Sudan, LIS survey teams traveled across the country from 2006 through 2009, state by state, to determine if communities had a recent mine/ERW victim, if the community was aware of mines/ERW on their land, and if community members were prevented from accessing natural resources or

[20] Upon South Sudanese independence, Sudan was reduced to 17 states. I use "state" here simply to refer to a political subdivision (as in the United States), rather than invoke a Max Weber or James Scott-type formulation.

infrastructure because they believed the land to be unsafe. These survey teams were comprised of Sudanese nationals trained in interview techniques according to SAC's protocols; they were not deminers and equipped to conduct any actual clearance. Some LIS surveyors would later find positions as mine-risk education team members (discussed in chapter four). While surveyors were national rather than international staff, many came from distinct and distant areas from where they were working. With the wide diversity of Sudan's ethnic groups, the socio-cultural differences between the surveyors and communities may have been an influencing factor in social interactions and subsequent information conveyance, just as it is with international staff's interactions. While "foreign-ness" on the part of international expatriates and local communities is expected, I was surprised to learn from Sudanese nationals in mine action organizations that they experienced a similar level of strangeness in their interactions across the country (I provide details of such interactions in the next chapter, as some Landmine Impact Survey team members later became mine-risk education facilitators). While prejudices between Northerners and Southerners may have been the most extreme, Sudan's wide geography is in part a function of colonial boundaries that inscribe conflict upon a wide diversity of communities and peoples by placing antagonistic groups within the same

administrative area. International expatriates were not the only ones who found some of Sudan's people in the hinterlands "strange" and "different."

When a survey team interviews a group of people in a village, the team investigates three issues: 1) if there have been any victims of landmines or unexploded ordnance within the past 24 months; 2) what types of explosive contamination are present; 3) and what such contamination blocks in terms of socio-economic resources, such as water sources, pasture, and schools or other institutions. SAC designated these three categories to measure the impact that landmines have on both physical safety and community livelihoods, therefore reflecting the shift from clearing the highest number of mines/ERW to those with the greatest livelihood hazard. Factoring in the social and economic dimensions of community life that are constrained by landmines reflects how the LIS focuses on not just fatal effects of landmines and minefields but how they have an adverse effect on people's lives in an arguably more ubiquitous way.

The protocols and standard operating procedures for an LIS make it clear that survey teams should make a good effort to interview a wide selection of community members to include village leaders, those in lower social positions, men, women, children, and people in different occupations. While the protocols and practitioners all

recognize these groups as having different experiences and knowledge, there is no specific guidance on what constitutes "a wide selection," and the complications of logistics and circumstance can at times leave surveyors with only a handful of individuals (men more often than women) who are available to answer the surveyors' inquiries. While conflicting claims of the location of landmines and of which areas are unsafe are inevitable, the protocols provide little guidance as to how to resolve these unavoidable inconsistencies.[21] The guidelines for interviewers simply state, "Resolving conflicting information is a challenge. In Yemen, male interviewees often exaggerated the number of animals killed by mine/UXOs, whereas women tended to be more correct. If there is huge disagreement in all communities (as in the Yemeni case), the survey shouldn't use that indicator for scoring."[22]

[21] Unfortunately for me, I was not able to find a satisfactory answer how LIS surveyors reconciled conflicting accounts from different community members. The records in Khartoum are the "final" product of the surveyors evaluation of differing claims. As such, the process by which the "final" records were produced has been "black-boxed" to me.

[22] Survey Action Center, *LIS Operational Protocol P05 v 3 - Guidelines for Interviewers in the Community Visit* (Survey Action Center, 2003), http://www.sac-na.org/pdf_text/lisprotocols/P05_Interviewers_030415.pdf. Surveyors can corroborate the figures of animals killed by mines/ERW by looking for animal carcasses and counting the number of explosion craters. At this point of my research and without access to field notes from the Sudan LIS, I cannot say how the survey teams made such contingent judgments.

Figure 6: A photo from the published LIS that reads "COMMUNITY INTERVIEW, KAPOETA TOWN, EASTERN EQUATORIA [South Sudan] (2006)."[23] This photo is not necessarily representative of all community interviews as not every community had a large number of informants. Photo from LIS.

Across Sudan, local hierarchies shape how the surveyors interacted with the communities with one surveyor emphasizing the need to "always ask the head person, man or woman; can't make conflict with community leaders!"[24] In some areas, religious and cultural customs dictated strict gender segregation, and the resulting LIS survey data were thus based on a handful of men speaking for a

[23] "United Nations Mine Action Office (Sudan) - 2010 - Landmine Impact Survey - Republic of Sudan.pdf," n.d., 21.

[24] Elfadil Ismail Koura, "Interview, Kassala, Sudan," March 27, 2011.

whole area. Other challenges arise regarding population samples being representative of collective local knowledge.

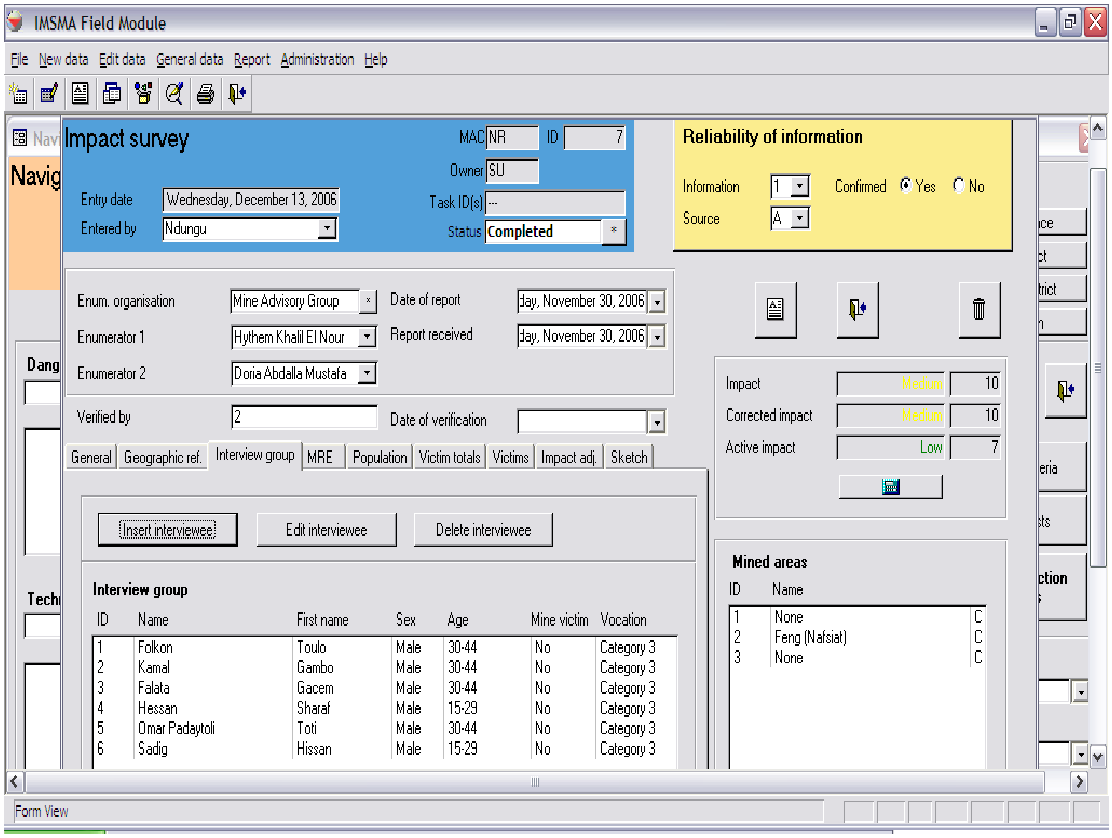

Figure 7: A screen capture from the database entry for an LIS report of a community. Data from November 2006.

Situated along the Sudan-Ethiopia border, Kurmuk, Blue Nile State is one of the country's most impacted communities with 32 recorded victims. The pre-war population was an estimated 10,000, and at the time of survey was halved as many fled the fighting. From that population of 5,000 people, the LIS interview group lists 8 men, two under 30 years old, and all of them having the same occupation

(Figure 7). The individual surveyors were not listed by name in the LIS data, and my attempts to find an explanation from someone on the survey team were unsuccessful. Speaking with others familiar with the LIS, I surmise that one explanation for a sample of 8 men representing 5,000 people who remained in the area is that Kurmuk was a heavily contested area between Northern and Southern forces (Southern forces attacked the North through Ethiopia, thus the North attempted to fortify Kurmuk as a first line of defense). Mines/ERW were certainly in the area, and with thousands of people living relatively close to one another and in proximity to the military camps, the local population undoubtedly could list numerous impacts. According to the surveyors' logic – and the mine action actors in Sudan – LIS data for this one area would confirm their existing knowledge.

In the Eastern States, the prevailing, gendered view among surveyors based on their encounters with local men in the area is that women rarely move from their homes and their limited experiences with socially permissible activities preclude them from being sources of information. Moreover, women generally do not answer questions while they might ask them: some of the male surveyors see the women's role as "just staying home and relaxing."[25] While survey data from other impacted communities such as Um Durain in Southern Kordofan draw

[25] Ibid.

from groups with a majority of women (4 women and 3 men speaking for 500 hundred households with 3000 people), Sudan's culture of patriarchy mirrors mine action's, a point not brought up in the LIS.

Although women are a part of some LIS survey teams, reflecting some of the gains in gender inclusion in mine action globally, such "gender mainstreaming" efforts run up against Sudanese norms that call for limited men-women interactions and few acceptable professions for women. For surveyors, their construction of a "representative" sampling of local knowledge is constrained by local customs and norms. The social interactions that surveyors (sometimes urbanized outsiders) can have with local communities, and particularly regions of Sudan that adhere to stricter Islamic and patriarchal norms, limits surveyors obtaining "good," "objective" information for the LIS. Producing the LIS – an effort to render information from disparate sources systematic – demonstrates that even the protocols that mine action principals take as objective and rational are subject to debate and that their implementation is not a clear application of principles onto practices.

One such practice in a survey team's interview with a community is the collective mapping exercise. More than any other part of the LIS process, community mapping produces a "local" perspective. "Local" is perpetually subjective and not a fixed

descriptor, and in one sense, a community map is local, relative to outsider, internationally-managed, military-oriented clearance organizations. In light of the discussion above, however, "local" also contains a top-down element from outside organizations, as well as embedded hierarchical relations within the community, which by definition precludes "local" knowledge from being equated with comprehensive knowledge. In other words, "local" knowledge is not an immediate panacea to informational biases or situational lacunae.

Regardless of which community members are available to meet with the LIS survey team, after greetings and introductions, protocol P05 "Guidelines for Interviewers in the Community Visit" calls for the survey team to ask the interview group "to draw a map of the suspected hazard areas (SHAs) that are affecting the community, along with major landmarks, roads and trails, bodies of water, and anything else that is relevant."[26] The community maps from the Sudan LIS were exercises in dictation; a member of the LIS survey team would transcribe what the interview group offered. This is a deliberate yet momentary reversal of expertise: the LIS survey team may claim specialized mine action knowledge, but the simple fact remains that these "experts" must ask local individuals where to begin finding mines/ERW. Thus, supposedly scientific knowledge ultimately

[26] Survey Action Center, *LIS Operational Protocol P05 v 3 - Guidelines for Interviewers in the Community Visit*, 4.

depends on the local.

Moreover, LIS surveyors do not have specific guidance on how to resolve differing and conflicting claims from locals about mine/ERW locations. One solution is simply walking toward the area(s) in question to establish if others in the community were suspicious of mine/ERW contamination. Another way to "resolve" the conflict is for the surveyors to err on the side of overstatement and mark any and all areas brought to attention as suspicious. This latter possibility is less of a resolution than pushing the question down the road for later mine action organizations to answer.

Figure 8 shows how these maps indicate compass direction and note the coordinates of a community reference point (often a landmark such as a mosque or school), but they are clearly not intended to be drawn to scale. The Suspected Hazardous Areas (SHAs) are displayed on the map in relation to other landmarks, as intended, rather than as to-scale drawings of the SHA. In addition, it is worth noting that the LIS community maps very deliberately frames SHAs in relation to other social places, rather than "to scale" in current Western cartographic conventions. After the interview group conveys to the surveyors the SHAs known to them, the survey team would ask the interview group to lead them to a safe viewing point from which to visually inspect the SHA to record any salient descriptions of them.

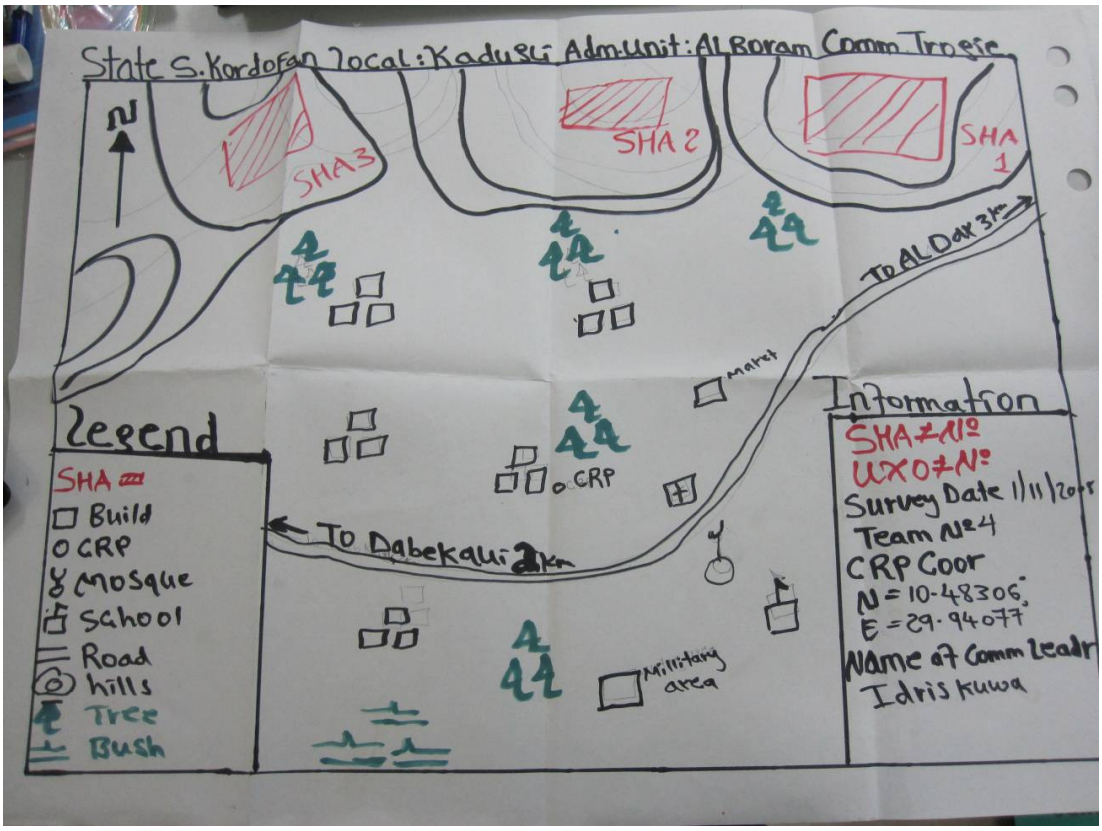

Figure 8: A community map drawn during an LIS community interview in November 2008. Eight individuals – seven men from the ages of 15 to 60 and older and one girl between the age of 5 to 14 – provided the information on the three Suspected Hazardous Areas shaded in red. Photo from April 2011.

Community mapping by LIS surveyors following established protocols is readily related to STS studies of surveying and mapping technologies. Bruno Latour states, "Yes, scientists master the world, but only if the world comes to them in the form of two-dimensional, superimposable, combinable inscriptions. It has always been the same story, ever since Thales stood at the foot of the pyramids."[27] Latour's description is a fair representation of the LIS survey process:

[27] Latour, "The 'Pedofil' of Boa Vista: A Photo-Philosophical Montage," 147.

quantification, standardization, and imposition of a coordinate system upon an area are all tools of modern technoscience. The historical and conceptual distance between mine/ERW-affected communities and the LIS surveyors working under formal protocols and on behalf of foreign donors accentuates such differences. As Timothy Mitchell notes, "expert knowledge works to format social relations, never simply to report or picture."[28] While LIS surveyors are sincere in their efforts to call attention to what SAC has termed "socio-economic blockages" – that is, socio-economic resources such as water, arable land, housing, or roads blocked by the presence of mines/ERW – they are simultaneously positioning themselves as the means by which the community can receive assistance. In other words, the very act of surveying does not merely describe but both tacitly and explicitly prescribes and formalizes particular viewpoints and objectives for mine action in Sudan.

The survey teams give each community a score once all of the interview questions are answered and the SHAs have been mapped and visually inspected. If the community had at least one victim of landmines or unexploded ordnance within the past 24 months, the survey teams give it two points. If the community believes there are landmines in the area, the surveyors will give another two points,

[28] Timothy Mitchell, *Rule of Experts: Egypt, Techno-Politics, Modernity*, 1st ed. (University of California Press, 2002), 118.

whereas unexploded ordnance such as undetonated mortars merit one point (landmines are most likely obscured in the ground whereas unexploded ordnance is most likely visible above ground, as shown in the figure below).

Figure 9: While landmines are generally obscured, unexploded ordnance (UXO) are often readily visible. Photo from UNMAO. Taken in March 2010.

The two categories are universal for every LIS. The third category of "socio-economic blockages" can vary by country. The international mine action community has identified ten general types of socio-economic blockages, which are codified in the LIS protocols as follows: 1) irrigated cropland; 2) rain-fed cropland; 3) fixed pasture used year-

round; 4) migratory pasture used seasonally; 5) drinking water; 6) water for other uses; 7) housing; 8) roads and paths; 9) other infrastructure; and 10) non-agricultural land. Survey teams give one point for each of the ten items that landmines or, as important, the *perception* of landmines has prevented a community from using. As LIS surveyors have neither the skill nor tools to conduct any clearance or find mines/ERW, most of the "points" are based solely on community reports, which may or may not correspond to material reality. Some mines/ERW may be readily visible, although this is not the norm.

Robert Eaton, executive director of SAC, makes it clear that the scoring of communities in the LIS is descriptive, rather than a normative ranking of communities to determine clearance priority.[29] As he put it, "all we do is collect this data and give it to the national authorities. The Sudanese are Sudanese: that's how things go."[30] In other words, SAC is "merely" capturing the situation on the ground, rather than advocating for a specific course of action beyond that of facilitating all mine action efforts (e.g., claiming pasture land ought to be cleared before the main road to a mosque). SAC does not want to be

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[29] Survey Action Center, "Resources - LIS Protocols"; Survey Action Center, *LIS Operational Protocol P08 v 3 - Impact Scoring and Community Classification* (Survey Action Center, 2003), http://www.sac-na.org/pdf_text/lisprotocols/P08_Impact_Scoring_030415.pdf.

[30] Robert Eaton Interview by Benjamin Wang, Takoma Park, MD, February 19, 2010.

in the position to dictate priorities to national authorities, who, at least in the rhetoric of mine action, are the ultimate decision-makers. SAC (and other NGOs who may be working within a country) stress that they are there at the request of the government and that their work is limited to what the government has stated and agreed upon. Such defensive rhetoric reflects ongoing concerns about charges of colonialism, as well as a broader effort to maintain neutrality and issue-based objectivity.

Once LIS surveyors have assigned communities a numerical score, they then interpret this number and designate an overall impact score of "high," "medium," or "low" in a three-tiered ranking. SAC is acutely aware that any classification schema "will necessarily remain arbitrary, no matter where the border values are set."[31] Even though they see these rankings as "arbitrary," they produce a ranking to aid national authorities in the prioritization of clearance resources. However, it is also an explicit endeavor to create a means of comparison between communities, both within Sudan and internationally. Such comparisons attempt to systematize information about Sudan that might have been haphazardly collected in the immediate aftermath of conflict. As Latour notes, "once classified, specimens that came from different locations and times become

[31] Scanteam Analysts and Advisers and Demex, *Evaluation of the Global Landmine Survey Process: Final Report* (Oslo: Scanteam; Demex, 2004), 3.

contemporaries of one another on the flat table, all visible under the same unifying gaze."[32] Although the production of the LIS is only possible after the achievement of some degree of social stability (viz. in the case of Sudan, after an established peace), it has the added characteristic of being a means of implementing a sense of order as well.[33]

In resolving the conflicting claims made by local individuals to LIS surveyors drawing community maps, the LIS survey deliberately attempts to *translate*, rather than transform, local perception and knowledge. I use "translate" as Michel Callon proposes, as a process constituted by four moments: *problematization* through the definition of actors and obligatory passage points, *interessement* by which actors' roles are defined, *enrolment* of actors into their roles, and *mobilization* of allies. In the mobilization stage where the LIS surveyors suffer the same fate as Callon's three researchers in which neither group maintains the role of spokespersons.[34] While SHAs are mapped, drawn, and incorporated into the UN's mine action database, they are not taken by UNMAO or clearance organizations as being wholly

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[32] Latour, "The 'Pedofil' of Boa Vista: A Photo-Philosophical Montage," 153.

[33] There have been few studies of landmine affected communities in Sudan, but one question that has been asked in other national settings is the degree to which local communities trust the declarations of national authorities or groups that are perceived to be outsiders.

[34] M. Callon, "Some Elements of a Sociology of Translation: Domestication of the Scallops and the Fishermen of St. Brieuc Bay," in *Power, Action and Belief: A New Sociology of Knowledge*, ed. Law (London: Routledge, 1986), 199.

representative of the problem of mines/ERW. In his narrative, and equally applicable to mine, Callon points out "the social and natural 'reality' is a result of the generalized negotiation about the representativity of the spokesmen."[35] While the LIS surveyors demarcate and inscribe SHAs to speak for local communities and for the activist-orientation in mine action, the contested premise of their "representativity" halts any further advancement of the LIS in mine action planning.

What the Landmine Impact Survey Reveals

By June 2009, the LIS teams had surveyed nineteen of Sudan's twenty-five states over a three-year period at a cost of U.S.$4.3 million. LIS team members describe their efforts during the three years with a degree of pride. One member thought of the LIS as "the very definition of small, rapid response survey, roll up your sleeves and do what needs to be done efficiently, using the same tents and laptops from day one to the last day."[36] Whether or not this is a fair representation of LIS efforts, such a characterization is a conscious counter to the perception that groups like the UN or other international NGOs are excessively bureaucratic, slow-moving, self-serving, and ultimately have little to show for their large expenditures.

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[35] Ibid., 211.

[36] Mustafa Bawar, "Interview, Khartoum, Sudan," November 28, 2010.

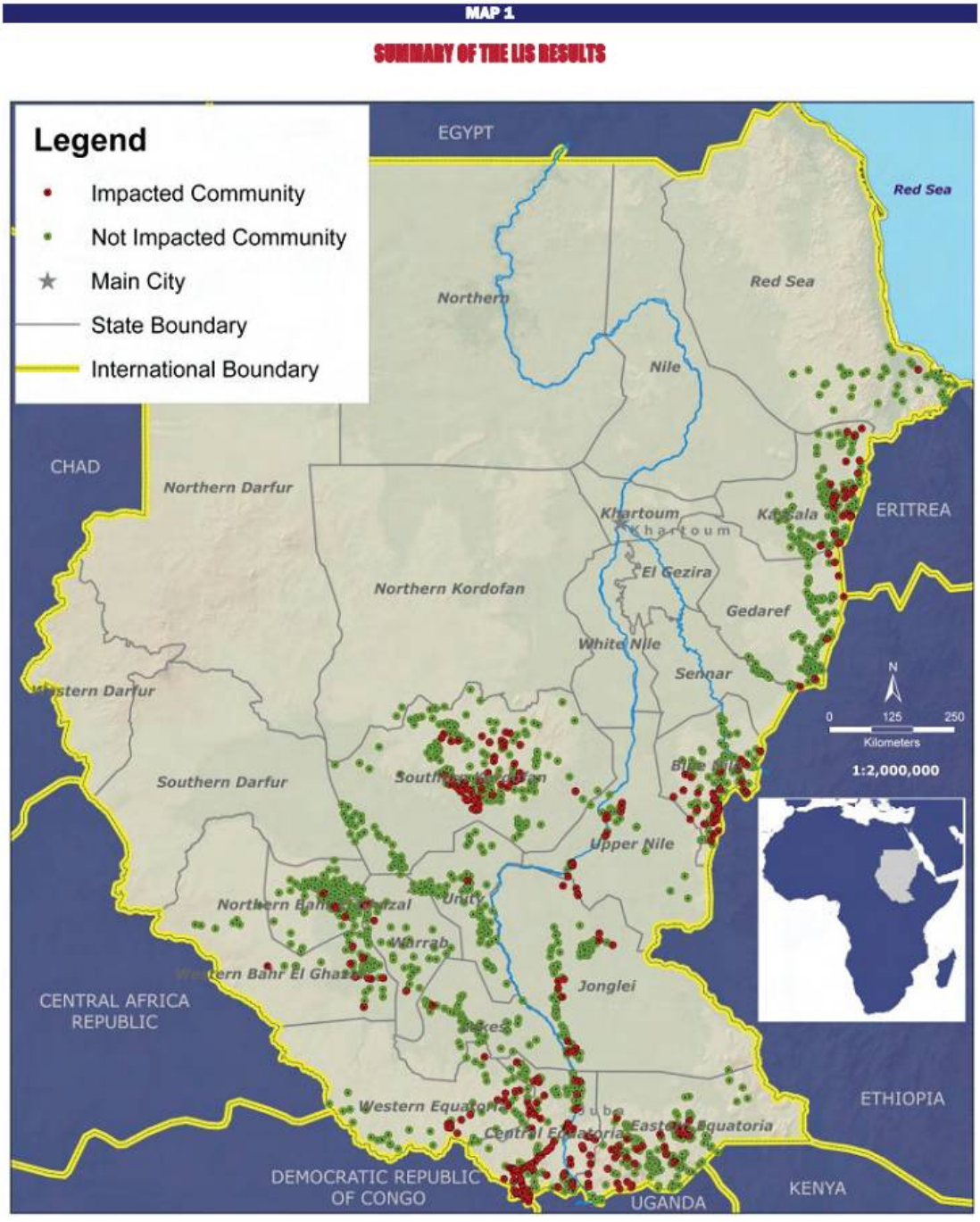

Figure 10: A visual summary of the LIS. Map from LIS. Published in 2010.[37]

[37] United Nations Mine Action Office, *Landmine Impact Survey - Republic of Sudan*, 2010, 8.

As data were published on SAC's website and distributed to mine action organizations in Sudan when each area was completed, the results of the LIS did not come as a surprise to mine action groups. Fifteen out of sixteen states have 296 impacted communities in 48 counties that are populated by 1.8 million people, not including the 680,000 estimated displaced people who may eventually return (Figure 5).[38] Eight percent (25) were designated high impact, 29% (85) medium, and 63% (186) low. All of the high impact communities and 71 of the 85 medium impact communities were in the South Sudanese states of Central Equatoria and Eastern Equatoria and the Sudanese states of Southern Kordofan, Blue Nile, and Kassala. These states were where a significant portion of the civil war was fought. Central and Eastern Equatoria are where the major Southern Sudan cities are located. The Southern forces also had bases in Ethiopia and Eritrea, hence the landmine contamination in Blue Nile and Kassala, which border those countries, respectively. At the same time, three states had only one affected community, and no communities were found in the state of Sennar. Using statistical analysis by Lawrence Moulton (a professor of international health and biostatistics at Johns Hopkins), SAC estimates that the LIS identified 90% of affected communities.[39]

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[38] Ibid., 21.

[39] Lawrence Moulton, "Annex XI - Estimation of Prevalence of Mine-Affected Communities," in *Landmine Impact Survey - Republic of Sudan*, 2010, 151–152.

However, the LIS of the Eastern States region, particularly Kassala, was limited by the Sudanese government's restrictions on travel and access to communities in the area: conflict in the Eastern States ended well after the ceasefire between the North and South, which contributed to the government wanting to limit access.[40] In the LIS, surveyors attempted to verify 36 existing Dangerous Areas in UNMAO's database, nearly one-third "were located in areas that were inaccessible to the survey teams." As the survey spanned from April to June 2007,[41] such inaccessibility was not due to the rainy season; the Khartoum government wanted to limit outsider's visibility to the conflict it continued to wage.

The LIS executive summary describes the number of communities affected before offering the following conclusion regarding on the amount of land contaminated by mines/ERW:

> The LIS identified 605 Suspected Hazard Areas (SHAs) with an unofficial estimate of 106 km^2 in total extent. SAC stresses that this measure of area is not an estimate of the area occupied by landmines/UXOs in Sudan but rather a careful documentation of areas that are blocked to community use by mines or fear of mines. Experience has shown that more lengthy general and/or

[40] During my time with UNMAO, there were discussions to re-survey Kassala, and the U.S. State Department issued a grant of $600,000 to Mines Advisory Group for surveying Kassala after the LIS for the 2011 fiscal year (October 2010-October 2011). When I left UNMAO at the end of May 2011, UNMAO and most of the UNMIS peacekeeping mission were already in the process of ceasing operations and inventorying equipment to donate or take with them. Despite Sudan's National Mine Action Center's expressed desire to resurvey Kassala, the survey was never completed.

[41] United Nations Mine Action Office, *Landmine Impact Survey - Republic of Sudan*, 134.

> technical surveys will result in significantly reduced areas indicative of actual landmine pollution. From a community point of view the difference is academic – whether they are not planting crops or using water sources for fear of real mines or only fear alone does not matter.[42]

Most notable about this summary is how the Survey Action Center explicitly frames the results of its survey within the terms of local communities' relationships to their landscapes, almost to the exclusion of mines/ERW that may or may not be present. By focusing on local community perceptions, LIS surveyors and SAC effectively obscure the material realities of animals inevitably moving across a suspect environment or the movement of Sudan's millions of internally displaced people traveling through areas that they do not know to be hazardous.

A larger structural issue with the LIS beyond the material realities I just described is that the ten socio-economic blockages are not equally relevant across all of Sudan. Although, while the LIS protocols can readily accommodate changes to tailor socio-economic blockages and subsequent impact scoring calculations, Sudan, like most LIS countries, stayed with the default options.[43] There is no indication that SAC coerced any LIS surveyed country to accept these default settings, but the wide application of these criteria points to the

[42] Ibid., 8.

[43] Eaton, interview; Eaton, interview.

power of established standards. While the blockages are to remain consistent across the whole country, some areas have fewer potential blockages than others. For example, in many of Sudan's arid areas, the category "access to drinking water" is highly relevant but "access to other water" does not apply. The unfortunate consequence is a community with a lower impact score by virtue of having less infrastructure than others may potentially be given a lower priority for relief and aid. The established standards inadvertently but very concretely affect both which areas are disadvantaged within the LIS framework and the level of intervention.

Another result of the LIS was what SAC has termed, a "retrofit" of UNMAO's official database. As LIS teams were already traveling across the country, they could visit Dangerous Areas already registered in the database and verify that the data entry matched what was on the ground in terms of coordinates or being verified by nearby communities (if a community could be located). This process of retrofitting was first conducted during the Afghanistan LIS and resulted in "approximately 50 percent of the [Afghan] database…discounted as being outdated and invalid. This section was replaced by an equal volume of new information."[44] The results in

[44] Patrick Fruchet and Mike Kendellen, "Landmine Impact Survey of Afghanistan: Results and Implications for Planning," *Journal of Mine Action* 9, no. 2 (February 2006), http://maic.jmu.edu/journal/9.2/focus/fruchet/fruchet.htm.

Sudan continued this trend in a less dramatic but equally significant fashion. Of the existing 1,186 Dangerous Areas in the database at the time of the retrofit, LIS teams and UNMAO cancelled 38% (456) of those Dangerous Areas when local community leaders considered the Dangerous Area not to contain mines. The remaining Dangerous Areas matched LIS SHAs were “spot clearance” tasks of single items of unexploded ordnance, were not linked to a community, were not accessible, or lacked GPS coordinates in the database entry. While it may seem that SAC and UNMAO's concern is with getting the data correct, it is important to remember that all mine action organizations are perpetually concerned about the limited resources made available for their work. Thus, focusing on data is not about data in and of itself, but also the larger context of scare resources for what work remains.

In my discussions with operations/clearance staff, database retrofitting was rarely brought forward or discussed. I find this surprising, given that this retrofit process embodies much of the quantifiable emphasis on information and data management that clearance operators value for its focused delineation of the scope of clearance. At the same time that the LIS was retrofitting data, however, it was also producing flawed and incomplete data. Despite data quality management protocols that were designed to prevent

errors by having all information checked and verified, a significant percentage of LIS survey forms contained blank fields. In other words, boxes and fields for SHA coordinates or the estimated size of SHAs were inexplicably empty.

Armen Harutyunyan, formerly the Northern Region Operations Coordinator and now a Senior Technical Advisor to the Sudanese NMAC, has published an article in the *Journal of ERW and Mine Action* calling attention to the problem of data management in mine action globally.[45] Harutyunyan notes that 35% of Dangerous Area Reports based on information gathered from the field and subsequently entered into UNMAO's database in Sudan are missing key data: location, size, what marking is used to designate the area as dangerous, distance from nearest town, direction from nearest town, type of area, which organization reported the Dangerous Area, or who was the local source of information. The article never explicitly identifies the data as coming from Sudan's database, and in the author biography section of the article, Harutyunyan does not identify himself as currently working in Sudan (although his affiliation in the author byline is given as United Nations Mine Action Service-Sudan). His intention is not a critique of the LIS, per se, as it is not clear how

[45] Armen Harutyunyan, "Information Quality Management in Mine Action," *The Journal of ERW and Mine Action* 15, no. 2 (Summer 2011), http://maic.jmu.edu/journal/15.2/specialrpt/harutyunuan/harutyunyan.html.

much of the faulty data comes from either the LIS or other survey efforts. Nor is his intention to criticize the people who work in mine action in Sudan. The larger point is that mine action actors and organizations ought to treat data with as much care as they treat the actual ERW in the field. The LIS and its results are one part of that issue, according to Harutyunyan, as mine/ERW data form the basis of both major mine action interventions and policy decisions.

Since the LIS's last survey of Southern Kordofan state in early 2009 (and Jonglei and Upper Nile states in South Sudan in mid-2009), UNMAO's records show that clearance organizations canceled approximately half (47%) of all the SHAs recorded in the LIS in the North. The remaining SHAs (53%) contain an average of 1.88 discrete minefields of varying size and density. However, in the Eastern States of Sudan, where LIS surveying was limited by the government to access communities, UNMAO plans to cancel 75% of SHAs based on the patterns in its work since 2005,[46] suggesting that UNMAO interprets the LIS as a significant overestimation and overstatement of mine/ERW contamination.

LIS staff members readily acknowledge that SHAs demarcate areas of land that may be larger than actual contamination, but defend large SHAs as an unavoidable cost of the benefits the LIS

[46] South Sudan has an even higher rate of cancelled SHAs; only 20% of are historically found to have minefields. (Citation: senior manager's meeting)

provides. While SHAs might be larger than areas that actually contain explosive hazards, the LIS in fact depicts Sudan as having a much less severe mines/ERW issue than initially estimated. In other words, there are not as many SHAs as mine action organizations and other interested social groups estimated, but SHAs that are established historically overestimate the scale and scope of mine/ERW contamination. This point is one that operations and management acknowledge, particularly as new Dangerous Areas are being discovered. That said, the rate of new DAs does not qualitatively change the fact that SAC considers Sudan, as a whole, not to have a high impact from mines.[47]

Conflicting Regimes for Surveying

While the LIS has been a major instrument in mine action for more than a decade and SAC is supported by many of the major institutions in the field, the tensions between the LIS and clearance-oriented actors concerning the survey's place, function, and utility remain and affect the way mine action continues in Sudan.

In 2003, SAC commissioned an official external evaluation of its Global Landmine Survey Process from two European consulting firms

[47] Given the large area of the former Sudan (prior to South Sudan's secessession), the extent of known mine/ERW contamination in concentrated areas across only five of Sudan's twenty-five states has led to the whole country being viewed as not highly contaminated.

with developing and post-conflict country experience. The evaluation pointed to some notable achievements, such as establishing surveys based on adaptable methodologies and standards within a few years and keeping mine action visible to donors and national authorities. One criticism by the auditing consultants was that the LIS is "an externally driven and defined process that is poorly integrated into national tools and tasks."[48]

The issue of the broader applicability of the LIS to a national government's post-conflict efforts – as well as the mine action field's efforts to make more direct linkages to development efforts – has confronted SAC ever since. Both evaluating consultant firms and SAC's own consultant noted "there is a need for [mine action] actors to come together to see how the LIS can be used for more rational sector resource allocations."[49] The knowledge of which populations in a country are mine/ERW-impacted, where SHAs are located, or which areas are found during the LIS to be mine/ERW-impact free are directly relevant to post-conflict recovery and development. Yet the LIS has not been taken up by aid and development organizations. For SAC and its auditors, the time and money spent producing the LIS could have additional value if the LIS were utilized by other organizations

[48] Scanteam Analysts and Advisers and Demex, *Evaluation of the Global Landmine Survey Process: Final Report*, 2.

[49] Ibid., 3.

working in the LIS-surveyed areas.

This constructive criticism from 2003 was repeated in a November 2009 document SAC produced on "Integrated Mine Action with Development: Enhancing use of Landmine/ERW Hazard Information by Economic Development Actors." This document attempts to shift SAC and its LIS from being singularly focused on mines/ERW and mine action toward integration within larger development plans in post-conflict countries. In other words, concern for mines/ERW in the ground is expanded to the socio-economic impact these objects cause and then to a larger scope of broad socio-economic development in what are most often post-conflict areas.

One motivation for this more expansive framing of socio-economic surveying is that funding for mine action is likely to decline with "donor fatigue," a widely used term by NGOs to describe the seemingly inevitable declining attention and subsequent funding to their cause. Thus, SAC's efforts to recast the LIS as able to contribute to economic development are a way to ensure adequate funding for this sort of surveying. While all humanitarian aid constantly faces the issue of costs and donor willingness, mine action's attention to the issues stems in part from its rule of thumb that a single mine costs several dollars while clearing a square meter costs just as much, if not usually more. Considering the relative size of a landmine to a square

meter, the costs of clearance are recognized by all mine action groups are subject to constant attempts of efficiency improvement.

Whereas LIS surveyors recorded local knowledge almost at face value, clearance teams are far more critical of locals' claims, scrutinizing their accounts, and using clearance technologies to reduce the size of the area claimed to be contaminated. As LIS surveyors move from community to community rapidly and may be unfamiliar with some areas, their survey data are a proxy of sorts for local knowledge in mine action. (What happens when clearance teams arrive into a community and work for an extended period will be discussed in chapter 3).

James Scott would see the disconnect between local concerns of mine/ERW contamination and mine action organizations' skepticism as further evidence that the "state" (in this case, the UN and foreign donors) could not assimilate local interests "into an administrative grid without being either transformed or reduced to a convenient, if partially fictional, shorthand."[50] By contrast, the concept of regimes of perceptibility positions the clearance organization's perspective as equally contingent upon history as on local interests and understandings. However, privileging "local" interests writ large as a corrective to UNMAO's position of financial power and (at the time)

[50] Scott, *Seeing Like a State*, 24.

access to development and aid resources does not ultimately address the existing structural inequities within Sudan's indigenous populations. For example, subsistence herders and agriculturalists clash over land rights, and by virtue of being sedentary, agriculturalists more readily benefit from economic development activities. (Yet, at the same time Sudan expert Douglas Johnson notes how in the South, "the agricultural peoples…were among the first to be 'pacified' by virtue of their accessibility and their limited ability to avoid government patrols).[51] The LIS's limited utility for UNMAO speaks to divergent regimes of perceptibility inherent in both the survey and a clearance-mindset. Although UNMAO will refer without qualification to the number of SHAs in Sudan and the number of affected people, UNMAO planning documents and other contexts point to the suspect nature of SHAs. In other words, UNMAO may selectively adopt a survey-oriented outlook, while at other times use a clearance-directed perspective to conduct its work.

The tension between communities' perceived impacts and clearance teams' perception of mine/ERW locations is, more precisely, about the power to determine what information is relevant. The mine action community as a whole stresses the role of "information," and the claim "in many ways, mine action management is as much about

[51] Johnson, *The Root Causes of Sudan's Civil Wars*, 18.

information as it is about landmines" echoes through the professional and conversational discourse.[52] Harutyunyan, again:

> unfortunately, the data-management function of mine-action operations has not received the same amount of attention [as quality assurance of clearance] when it comes to quality management of data. While this does not necessarily relate to the safety of operations, poor quality data collection, analysis and dissemination might lead to allocating additional resources to deal with the consequences of data-management problems.[53]

Harutyunyan's point about ensuring the accuracy of all mine/ERW data (e.g. that database entries for Suspected Hazardous Areas should have full geographic coordinates and approximate sizes) highlights the mine action field's fixation on *who* has the authority and ability to collect the much needed information necessary for mine action efforts, and *how* that information is collected.

SAC has attempted to position the LIS as a first point of authority, and a critical part of SAC's definition of the LIS being an early stage obligatory passage point is relying on community reporting. That SAC's requirements are far less intensive than "technical" work generally supports this claim, as LIS survey teams are able to move more quickly, unencumbered with all of the resources and support necessary for a clearance team. One survey team in a single Land Cruiser can cover more ground and speak with more people than a

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[52] Geneva International Centre for Humanitarian Demining, *A Study of the Role of Survey in Mine Action*, 1.

[53] Harutyunyan, "Information Quality Management in Mine Action."

four vehicle convoy carrying skilled deminers trained to follow stringent safety protocols in their work. At the same time, by acknowledging that other survey work must be done following the LIS, thus allowing for other forms of information to be used effectively in mine action, the possibility of effective clearance without the LIS arises. This ambivalence is one contributing factor to the LIS's contested place in mine action.

In a larger scale beyond individual SHAs, LIS proponents explain that one part of the LIS's difficulties in the operational world is that it becomes a *de facto* plan to make up for UNMAO's inability to plan quickly and effectively. These proponents point to the fact that UNMAO only established a strategic plan for mine action in 2009, several years after it began operations.[54] As the LIS was completed state-by-state and finalized in 2009, the results of each state went into UNMAO's central database and subsequent planning.

SAC always intended for the LIS to be a *first* survey, what was previously termed a Level 1 survey, and throughout the survey, it has made clear that a "technical" survey conducted by deminers who are trained and equipped to find the physical boundaries of a mine/ERW area should follow. A technical survey is, however, still a significant

[54] See Sudan Mine Action Sector, *Multi Year Plan* (Khartoum: United Nations Mine Action Office, 2009), http://reliefweb.int/rw/rwb.nsf/db900sid/MUMA-7UA4RF?OpenDocument.

undertaking, requiring the same infrastructure, resources, and assets as a full clearance operation. Yet, without a technical survey, clearance-oriented actors see the LIS as having very limited use. Some mine action groups frame the LIS process and the demarcation of SHAs as a step in a linear process towards a more accurate picture of mine/ERW contamination. Others, primarily those who identify themselves as having a high degree of technical demining knowledge, dismiss the LIS and other "non-technical" surveys and instead advocate for earlier sampling through manual or mechanical technical survey.[55]

Whereas Timothy Mitchell's great land map of Egypt "was not just a new way of representing an existing object…the map helped to constitute and consolidate [a] new institution…thus mapping played a role in producing the distinction between land as 'mere object' and the abstractions of law, taxation, and title,"[56] the LIS is not afforded such status by clearance managers. The clearance managers' criticisms demonstrate a degree of analytical sophistication in that they question the objectivity seen in numbers and charts. At the same time, these managers see their "technical" methods as provably objective, a point I

[55] I observed this sentiment on many occassions in settings such as the Croatian mine action center's annual demining symposium held for the international mine action community. Not surprisingly, individuals with experience with mechanical clearance assets were strong proponents of this technology's use and deployment.

[56] Mitchell, *Rule of Experts*, 93.

take up in chapter three. The critiques of the LIS's objectivity are not in themselves objective. The maps and figures are based on people (community members and surveyors) who lack "technical knowledge" making gestures towards an area, which, for clearance managers, is less credible than the facts in the ground, perceived by metal detectors and armored machines.

As Theodore Porter notes, "the appeal of numbers is especially compelling to bureaucratic officials who lack the mandate of a popular election…objectivity lends authority to officials who have very little of their own." This is especially applicable to outside organizations that come into Sudan with a contract from the UN but still need to demonstrate their competencies and abilities in country. However, this raises the issue of what is objectivity and who defines how such objectivity is constructed. Clearance operators see the objectivity as being a quantified subjectivity, replete with more precise measurements through specialized instrumentation and skilled techniques.[57]

In an essay on colonialism, science, and postcolonial technoscience, Suman Seth highlights how "as part of the civilising mission, science played two contradictory roles in colonial discourse, at once making clear to the 'natives' the kind of knowledge that they

[57] I will return to this issue in chapter three.

lacked (which omission justified colonialism itself), and holding out the hope that such knowledge could be theirs." Considering the institutional structures of mine action and the organizations that conduct mine action activities, Seth's characterization of technoscientific engagement between the global North and Sudan seems fitting, even in light of Sudan's status as postcolonial state. The implementation of standards, funding for expensive mine action, and expatriate staff can all be framed as seeking to redress local ignorance and deficiencies. At the same time, "capacity building" of Sudan's national authorities to engage in mine action without assistance is mere rhetoric, an invocation of development discourse's ideal, and as a way of sustaining mine action "holds out the hope" for Sudan's potential future as a "developed" nation.

That said, the LIS occupies a particular space within mine action, one outside of the two roles described above: demonstrating to Sudan their deficiencies while promising that such deficiencies could be overcome. The LIS does not directly impose mine action knowledge as a reaction to local ignorance; on the contrary, survey teams are explicit in attempting to enlist local individuals and communities to help them in their work. The asymmetries of information and access to power and resources are challenges that any mine action survey, clearance, and to a lesser extent, mine-risk education team faces when

approaching a community. While these teams have the trappings of wealthy outsiders (UN emblazoned vehicles, equipment, insignia clothing, etc.), they rely heavily on local knowledge and ultimately local cooperation. Such mine action teams feel stymied at times when they perceive locals as uncooperative. When teams ask communities to indicate where mines/ERW or suspected hazardous areas may be, responses have sometimes been "you are the expert. You tell us," "You should already know. You are the expert," "we have already told earlier surveyors. Ask them." (I will return to this issue in chapters 2 and 3.)

At the same time, LIS surveyors do not encourage or promise local communities that mine action knowledge will be theirs; just the opposite. Extending McGrath's point above that "non-technical" information from the LIS has no utility for clearing mines/ERW, mine action continually reinforces the point that non-mine action actors should not engage in any sort of clearance and cannot do so without injury or death. With the LIS, then, the most problematic way to interpret the survey is that those who develop and conduct the survey appeal to quantification and use the language of rational objectivity in such a way as to challenge the expertise embedded in the clearance-oriented regime.

This chapter has examined some of the conflicts between LIS surveyors and clearance-oriented actors. The tension between these

regimes emerges in UNMAO and in the mine action community as a whole in the new, formally codified process of land release: an increasingly comprehensive process to deem land "safe" (I discuss this process in chapter three). In the next chapter, I will examine the interactions between local communities and those clearance-oriented actors when the latter eventually travel to the communities' SHAs and begin their work of clearing mines/ERW and ultimately declaring the land "released."

CHAPTER 2: "EXPERTISE" IN MINE-RISK EDUCATION

In order to travel across Sudan as someone affiliated with the UN peacekeeping mission, I was required to complete the UN's two-day "Safe and Secure Approaches to Field Environments" course. This course was mandatory for all UN staff in-country to travel outside of Khartoum and consisted of one day in a classroom and one day outside for practical exercises to cover different modules: fire safety, radio protocols, hostage situations, etc. And mine-risk education.

While the course instructors came from across the globe with various law enforcement and military backgrounds, the mine-risk education material was provided by the UN Mine Action Office in Sudan. One of the key messages during this module was "if you see one landmine, stop! Do not move any further, and do not try to retrace your steps. You are in a minefield! Call out a warning to any nearby for them to stop, and try to contact help." It struck me as a very cautious message: essentially a mine equals a minefield. All of the proper communications protocols and informing all relevant parties in advance about any of travel in accordance with procedures suddenly made a lot more sense.

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After I completed the training course and was able to observe UNMAO's implementing partners in the field, I was a little surprised to

hear the same basic message told to a Sudanese community. Given all that I had been reading and learning about the concerns in mine action about overestimating the size of contaminated areas and consequent risks, I was surprised by mine-risk education's seeming blanket statement that seemed to inflate the mine/ERW threat. For me, two parts of professional mine action were in tension with each other. As we saw in the last chapter, local communities were a key source of information, and the same cautious message that I had received could reinforce the perception that suspected hazardous areas actually contained the concentration of mines/ERW expected.

Figure 11: A mine-risk education session. This photo appears regularly in UNMAO publications. Photo from UNMAO. Taken in May 2009.

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The school was a box of a building in a rural part of Kassala where most structures were tent huts made of cloth, wood, and straw. Kassala state had limited coverage during the Landmine Impact Survey, but some organizations had recently begun to work in the area. One of them, Mines Advisory Group (MAG), had arranged with the community leader to use the school as a meeting place to conduct a mine-risk education session, and UNMAO's officer for mine-risk education and a Sudanese quality assurance officer working for the government were going to conduct quality assurance of the NGO's presentation to ensure MAG's adherence to the established mine-risk education curriculum.

Like other mine-risk education presentations I had seen, this one followed a standardized format, covering mine/ERW identification, warning sign recognition, and appropriate responses and behaviors. Again, the same equation: a mine equals a minefield.

At some point, I noticed that one of the mine-risk education facilitators moving to the front of the classroom to take a picture, not of her colleague but of the men in the audience.[1] The decision to take a picture of a group of men sitting and listening struck me, and such a picture would only have meaning in the context of what the men were

[1] I am attentive to my place and position within this scene and throughout my seven months with UNMAO in coutry. One moment in particular illustrates the effect of my presence, and I discuss it later in this chapter.

seeing and hearing. However, their presence must signify something, or else the facilitator would not have gone through the effort of moving to the front corner.

Figure 12: A mine-risk education session. Note the facilitator in the corner photographing the audience (as well as my position in reference to the photographer). Taken in March 2011.

Introduction

As the international community began to recognize the threat of mines/ERW to civilians, awareness and educational campaigns became a part of the humanitarian response to this issue. These activities were far quicker and less expensive than surveying and clearance, and they could reach a large number of people easily.

Unlike clearance, these awareness and educational campaigns are not meant to make a material change in the environment. At the same time, these activities are intended for the local populations, as opposed to surveying which directly helps clearance organizations and planning authorities and only indirectly benefits local communities.

Since the first awareness and educational efforts began in the early stages of mine action in the late 1980s and early 1990s, the conceptualization of what practices are effective has undergone changes, analogous to the developments in survey and clearance. A main objective of awareness and educational campaigns is to convey to local communities and populations how to perceive and manage the risks and hazards from mines/ERW. These explosives are presumed to be in their local environment and therefore have potential consequences on their lives and livelihoods. Such awareness campaigns are not just educational: they are a form of knowledge production about the communities' environments. As Steven Shapin and Simon Schaffer argued, producing "matters of fact" – in this case, establishing the perception of explosive hazards in the environment – does not require absolute or universal assent.[2] Like the focus of the Landmine Impact Survey on the socio-economic impacts of mines/ERW, mine-risk education (MRE) embodies the activist-oriented

[2] Shapin and Schaffer, *Leviathan and the Air-Pump*, chap. 2.

regime in which mines/ERW remain black-boxed, to the consternation of clearance organizations who see first and foremost the contaminated landscapes – and not necessarily the people living on the land –differently.

Mine-risk education has been in practice for nearly two decades, and throughout that time, other mine action organizations and actors have questioned its efficacy and effectiveness. Given the large numbers of people who "receive" mine-risk education (over 400,000 people in 2011 in Sudan alone),[3] the deceptively simple question "how many people could have been a mine/ERW casualty but were not due to mine-risk education" has yet to be answered definitely. In part, this question results from the lack of agreed metrics as the question rests on the difference between the source and the cause of accidents, or alternatively among different causes. While mines/ERW can be said to have "caused" an accident, so too did the need for water or firewood that led a person to walk across a contaminated area. Whereas clearance (including surveys) seeks the source of accidents, mine-risk education is an effort to reduce the risks people undertake.[4] Mine action organizations such as the Geneva International Centre for

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[3] International Campaign to Ban Landmines, "Landmine & Cluster Munition Monitor | Country Profiles | Sudan | 2010," *Landmine Monitor 2010*, 2010, http://www.the-monitor.org/index.php/cp/display/region_profiles/find_profile/SD/2010.

[4] I thank Daniel Ahlquist, Laura Rickard, and Djahane Sahelabadi for pushing me to clarify my point in this paragraph.

Humanitarian Demining persistently call for establishing clear indicators to measure mine-risk education's success in reducing the likelihood of a mine/ERW accident. These calls come particularly in light of the general problem of *attribution*, the inability to "attribute the results observed to the actions of [a mine action] programme."[5] While there is an obvious financial dimension to establishing a cost-benefit basis to attribution, there is also the larger aspect of simply identifying effective measures that reduce mine/ERW accidents.

Attribution as described above is a category of analysis for mine-risk education organizations and mine action as a professional discipline, and it has wider relevance as the organizations portray their work to international donors and in the media (their own and in journalistic outlets). It also reveals an ambiguous tension within mine action: the simultaneous desire for quantification in some domains and qualitative metrics in others points to a selective choosing of measurement suited to different ends. This "attribution problem" in the context of mine-risk education thus illustrates a challenge within the activist-oriented regime and the move by mine action groups within this regime towards qualitative, rather than quantitative, accounts of their work. For STS, attribution in mine-risk education

[5] Geneva International Centre for Humanitarian Demining, ed., *Mine Action: Lessons and Challenges* (Geneva: Geneva International Centre for Humanitarian Demining, 2005), 332, http://www.gichd.org/publications/mine-action-lessons-and-challenges-2.

highlights the limits of imposing rational objectivity on the contingencies arising from an on-the-ground reality. It also demonstrates the limits of a social technology when confronted with materiality.

In this chapter, I first lay out the history of mine-risk education as a global endeavor, advocated in large part by UNICEF. I then discuss how mine-risk education became a part of mine action efforts in Sudan, with national NGOs able to adapt mine-risk education to the particulars of the various contexts across the country. I highlight the perpetual issues and discussions of postcolonialism pertinent to most of the mine-action activities covered in this section. Perhaps more than other mine-action activities, mine-risk education is subject to more criticisms from within, and I address how such criticism centers on the boundaries between "nontechnical" and "technical work." The issue of the multiple constructions of mine-risk education emerges throughout the chapter, and I address it in the last section of the chapter.

As I will discuss in this chapter, there are multiple dimensions to mine-risk education work which stem from the activist-oriented regime. The organizations and individuals involved in mine-risk education attempt to change people's behaviors, rather than the hazardous environments in which these people find themselves. Such

change is through deliberate and simultaneously spoken performances for both the organization and audiences. The work of mine-risk education organizations enacts a narrative replete with images to be used for the organizations' own purposes as well as for supporters, donors, and outside audiences.

Establishing Global Mine-Risk Education

The opening scene of this chapter is a portrayal of the UN's "Safe and Secure Approaches to Field Environments" course, and it is one representation of how the International Mine Action Standards (IMAS) define mine-risk education. Officially, IMAS defines mine-risk education as

> activities which seek to reduce the risk of death and injury from mines and ERW, including unexploded sub-munitions by raising awareness and promoting safe behaviour. These activities include information exchange with at-risk communities, communication of safety messages to target groups, and support for community risk management and participation in mine action. The objective is to reduce the risk to a level where people can live safely, and to recreate an environment where economic and social development can occur free from the constraints imposed by contamination.[6]

This definition and understanding of mine-risk education is the result of more than a decade of practices, organizations, and standardization

[6] United Nations Mine Action Service, *IMAS 12.10 Mine/ERW Risk Education, Second Edition*, 2010, 8, http://www.mineactionstandards.org/fileadmin/user_upload/MAS/documents/imas-international-standards/english/series-12/IMAS-12-10-Ed2.pdf.

efforts directed largely by the United Nations Children's Fund. I will briefly describe this history before moving into how mine-risk education is conducted specifically in Sudan.

Just as landmine clearance emerged as a separate humanitarian activity in Afghanistan in the late 1980s, so too did mine *awareness* for local communities begin there.[7] Within a few years, as the threat mines/ERW pose to civilians became more widely recognized, such awareness initiatives by humanitarian organizations such as Handicap International and early mine action organizations, particularly Mines Advisory Group and Norwegian People's Aid, developed in Angola, Cambodia, Northern Iraq, and Mozambique. Their efforts were simultaneously meant to raise awareness and function as a temporary solution to mine/ERW accidents until a clearance team arrived.

In documents published by the UN and Geneva International Center for Humanitarian Demining, accounts of these early awareness programs describe how "initially, [such] approaches tended to be one-way and largely non-participatory, using a variety of 'small media', such as posters, leaflets, billboards and T-shirts."[8] Such retrospective

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[7] For a detailed account of how mine-risk education became established, see Geneva International Centre for Humanitarian Demining, *Mine Action: Lessons and Challenges*, 133–169; Sharif Baaser, Hugues Laurenge, and Eric Filippino, "Mine-risk Education in Mine Action: How Is It Effective?," *The Journal of ERW and Mine Action* 13, no. 1 (Summer 2009), http://maic.jmu.edu/JOURNAL/13.1/feature/Baaser/baaser.htm.

[8] United Nations International Mine Action Standards, *An Introduction to Mine Risk Education*, IMAS Mine Risk Education Best Practice Guidebook 1 (Geneva: United

characterizations are deliberately negative as they allow for more favorable portrayals of recent developments in mine-risk education and the current state of the field.

As various organizations were developing mine clearance and mine awareness/risk education programs in various countries across the globe throughout the 1990s, the efforts of anti-landmine activists – most notably the International Campaign to Ban Landmines – were gaining traction in international law (discussed in the introduction). From the outset, the effort to regulate and ban landmines included at least some efforts at mine-risk education. In fact, the existence of such awareness programs was something anti-landmine activists brought into the negotiations of various international laws.

The first legal instrument to address landmines was the 1996 Amended Protocol II to the Convention on Certain Conventional Weapons, which sought to regulate, rather than ban, landmines. On the issue of mine-risk education, the protocol contained "provisions on feasible precautions to protect civilians through the installation of signs and 'warning activities.' The negotiators in this instance were not only referring to those warnings at the time of the use of weapons, but also to awareness campaigns that could take place for the duration of

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Nations, 2005), 21, http://www.mineaction.org/downloads/1/1%20-%20Introduction%20to%20Mine%20Risk%20Education.pdf.

the minefield's existence."[9]

International activists regarded the amended protocol as a failure and pushed for what would become the 1997 Anti-Personnel Mine Ban Convention (also called the Ottawa Treaty). Article 6, Paragraph 3 of the Convention reads:

> Each State Party in a position to do so shall provide assistance for the care and rehabilitation, and social and economic reintegration, of mine victims and for mine awareness programs. Such assistance may be provided, inter alia, through the United Nations system, international, regional or national organizations or institutions, the International Committee of the Red Cross, national Red Cross and Red Crescent societies, and their International Federation, non-governmental organizations, or on a bilateral basis.[10]

Thus, mine-risk education was a legal requirement of the Ottawa Treaty. However, it was not immediately subject to the same professionalization efforts that clearance was. For example, the first two iterations of International Mine Action Standards in 1997 and 2000 did not address mine-risk education, and it was not until 2001 that UNICEF began to develop mine-risk education standards.

As the UN explains, one reason for this delay was that the different organizations engaged in mine-risk education did not readily

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[9] Gustavo Laurie, "An Analysis of MRE Provisions in Recent MA-related Conventions," *The Journal of ERW and Mine Action* 14, no. 1 (Spring 2010), http://maic.jmu.edu/journal/14.1/Notes/laurie.htm.

[10] *CONVENTION ON THE PROHIBITION OF THE USE, STOCKPILING, PRODUCTION AND TRANSFER OF ANTI-PERSONNEL MINES AND ON THEIR DESTRUCTION*, 1997, https://www.un.org/Depts/mine/UNDocs/ban_trty.htm.

exchange "best practices" or work together to improve their efforts. Such lack of information was less a deliberate lack of cooperation than the inevitable result of lacking time, resources, and established means of communication.[11] In an attempt to rectify these problems, in 2000, the United Nations Mine Action Service (UNMAS), the focal point for mine-related activities within the UN system, requested UNICEF to develop international standards for mine-risk education. UNMAS is the office within the UN Secretariat responsible for the development and maintenance of international mine action standards. UNICEF is the primary actor within the UN in undertaking mine-risk education.

UNICEF moved to create International Mine Action Standards for mine-risk education based on the perceived success of standards already in practice for manual clearance, and subsequently decided to produce MRE guidelines and *national* MRE standard operating procedures in the coming years. By October 2003, UNICEF had completed a set of eight MRE standards, which were formally adopted as IMAS in June 2004.[12]

The initial eight standards laid out both requirements and recommendations for virtually all aspects of mine-risk education:

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[11] United Nations International Mine Action Standards, *An Introduction to Mine Risk Education*, 23.

[12] A second edition of mine-risk education IMAS was released in 2010 and simplified the previous seven IMAS into one on "Mine/ERW Risk Education." Little content changed between the older and newer editions.

program management, accreditation, monitoring, data collection, assessment, planning, implementation, and evaluation.[13] In doing so, these standards also defined the different activities and institutional arrangements that collectively constitute mine-risk education. Because these standards emerged from the UN, it is important to remember that IMAS was intended in part to guide and direct mine action activities within a framework that privileges rational planning, recognizable to all stakeholders as supposedly universal and objective. The mine-risk education IMAS for "data collection and needs assessment" states at the outset "an essential part of any mine-risk education (MRE) programme or project is the needs assessment and the development of a data collection system, which allows an MRE organisation to plan, implement, monitor and evaluate its activities."[14] Such an evaluation informs both on-going implementation as well as future mine-risk education projects. As described in the schematic diagram illustrating the project cycle in figure 13, such evaluation "review(s) the local mine and UXO risks, review(s) the community

[13] The specific IMAS are IMAS 07.11 Guide for the management of mine-risk education; IMAS 07.31 Accreditation of mine-risk education organisations and operations; IMAS 07.41 Monitoring of mine-risk education programmes and projects; IMAS 08.10 General mine action assessment; IMAS 08.50 Data collection and needs assessment for mine-risk education; IMAS 12.10 Planning for mine-risk education programmes and projects; IMAS 12.20 Implementation of mine-risk education programmes and projects; IMAS 14.20 Evaluation of MRE programmes and projects.

[14] United Nations Mine Action Service, *IMAS 8.50 Data Collection and Needs Assessment for Mine Risk Education*, 2003, iii, http://www.mineactionstandards.org/fileadmin/user_upload/MAS/documents/imas-international-standards/english/series-12/IMAS-12-10-Ed1.pdf.

needs, and refine(s) the MRE plan and its implementation."[15]

[15] United Nations Mine Action Service, *IMAS 12.10 Planning for MRE Programs*, 2003, 14, http://www.mineactionstandards.org/fileadmin/user_upload/MAS/documents/imas-international-standards/english/series-12/IMAS-12-10-Ed1.pdf.

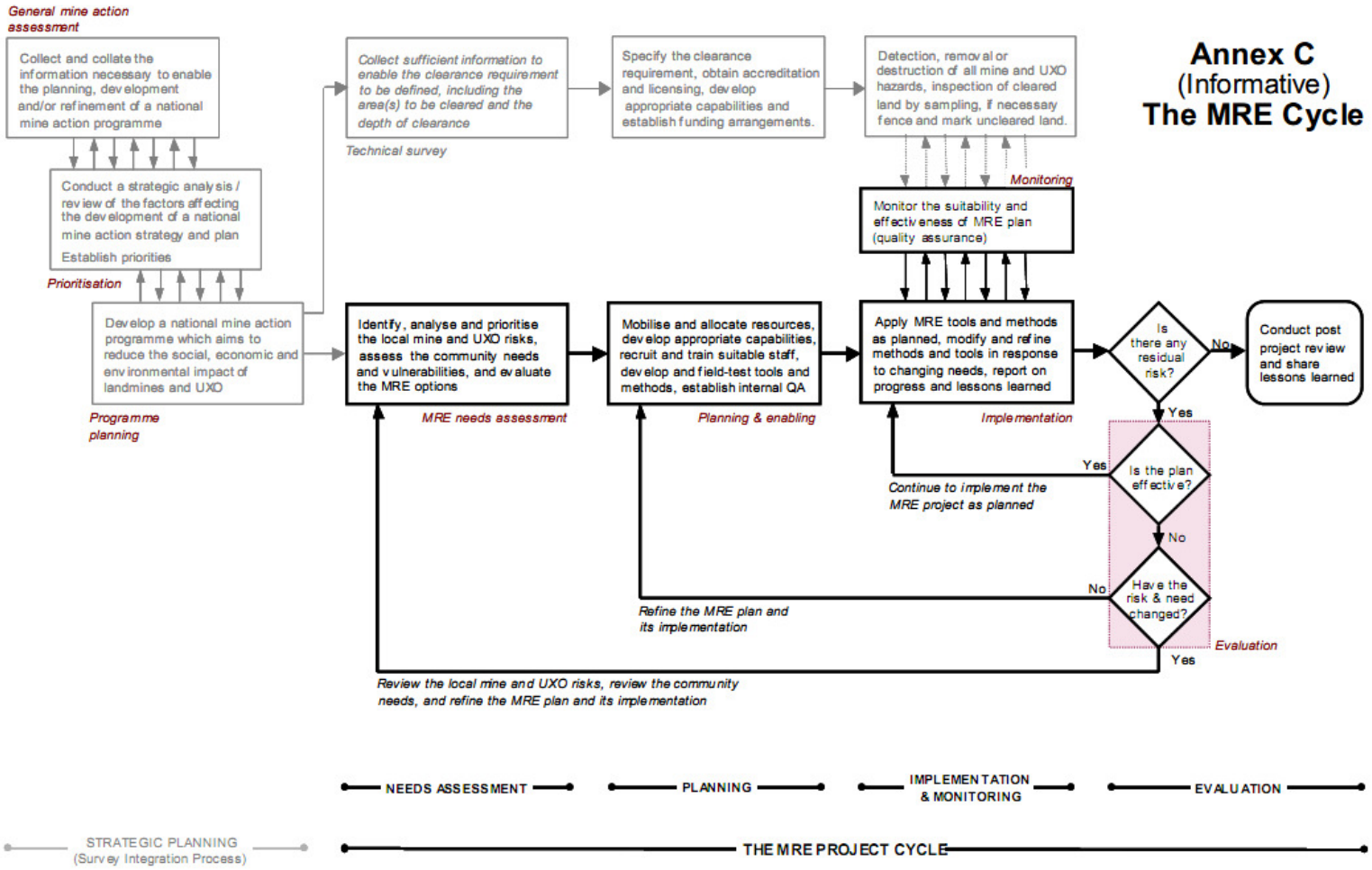

Figure 13: A flowchart depicting the sequential step of a mine-risk education program. Diagram from UNMAS. Published in 2003.

A key part of these standards was a shift from mine-awareness campaigns to mine-risk education. As one mine-risk education official described, whereas mine awareness focused on "the sensitisation and awareness activities in mine action projects" in the form of large presentations and informational and media campaigns, mine-risk education now includes

> all the educational aspects aiming at changing risky behaviours of affected populations, which often need creative and concrete solutions to deal with severe socio-economic constraints. Also, they comprise a substantial shift in improving the quality and diversity of interventions. MRE shifted from a more information-oriented approach, based mostly on quantitative indicators, to a more education-oriented one, based on qualitative indicators.[1]

It is worth noting here how mine-risk education professionals see their field in mine action improving by shifting away from the quantitative information that is a hallmark of the clearance-oriented regime. Yet, while the mine-risk education field strives for education-oriented qualitative indicators, the International Mine Action Standard on mine-risk education planning provides general directives with little guidance on how to implement imperatives to "be culturally appropriate," and "offset urban and gender biases and other biases." While the IMAS are deliberately global in scope and intended to be supplemented with national level standards, the standards require an

[1] Pia Cantini and Valentina Crini, "INTERSOS: Thinking Over and Practicing MRE in Iraq," *Journal of Mine Action* 9, no. 1 (August 2005), http://maic.jmu.edu/Journal/9.1/Focus/crini/crini.htm.

knowledge and expertise about mines/ERW and public engagement to be enacted as intended in the wide variety of mine/ERW-affected contexts.

Also codified in mine-risk education were "needs assessments" at the beginning of the "MRE project cycle" and "evaluation" at the end of the project cycle. Determining what mine-risk education material best suits a local cultural context is one reason for such assessments. This is a positive step as the mine-risk education field recognized that some of its efforts, while well intentioned, were problematically conducted and received. For example, in the 1990s, UNICEF, USAID, and DC Comics' collective efforts to use Superman and Wonder Woman comic books for mine-risk education in Latin America and Eastern Europe perpetuated problematic depictions of white outsiders literally coming from above to rescue local children from picking up mines/ERW and hurting themselves. Perhaps more troubling was the misconception some of the children took from the comics: if they picked up a shiny metal object (that could be an explosive), a fantastic superhero would appear. It took only a few such accidents before UNICEF replaced these mine-risk education materials with something more culturally adapted. The characters in visual material now tend to resemble the racial-cultural audience (or at the very least appear to be familiar), and other material such as plays are produced and

performed by local actors. Such adaptations arising from assessments and evaluations fit within a framework of progressive improvement, but it is not clear how lessons learned during each project cycle remain in an organization's collective memory or institutional knowledge. Furthermore, mine-risk education is not always a formal, regular, and discrete activity, and a mine-risk education facilitator seconded to a clearance team could be working on a more ad-hoc basis.

The new IMAS for mine-risk education additionally established a community liaison role for mine-risk education teams to engage more directly with local communities. Teams would inform communities of clearance activities and explain what was occurring; at the same time, these teams would convey local information and reporting to clearance organizations and national authorities. From the perspective of the mine-risk education field, this type of outreach fosters a greater sense of local involvement. Furthermore, mine-risk education teams could verify data and gather information for a national mine action center. The rationale for using a mine-risk education team, rather than a clearance team, for this purpose is that the former is quicker and less costly. As some mine-risk education staff were previously surveyors for Sudan's Landmine Impact Survey, this responsibility is thus possible for mine-risk education teams.

The mine-risk education field points to this liaison element and the broader trend towards community participation as positive developments:

> Such a community liaison approach appears to be the way forward for MRE. It is a reflection that education in the traditional sense has often overlooked many of these approaches and has not linked well with clearance organizations – particularly with regard to prioritisation and sharing the data gathered from communities. However, still too many programmes continue to undertake inappropriate "traditional" programmes of questionable value and impact."[2]

The passage above explicitly challenges the material focus of the clearance-oriented regime on mines/ERW on the grounds that such a regime proves difficult to connect clearance activities with the people and communities such activities ostensibly benefit.

One pragmatic consideration in the "one-way" messaging-community liaison divide is that the latter requires a high level of cultural competence in a wide variety of local contexts, something that international NGOs often initially lack when establishing themselves in a country. After several years of operations, however, this initial justification for continuing large awareness-raising sessions becomes increasingly tenuous. Anthropologist Andrew Gilbert points out that an "emergency" is an alibi for foreigners in one of three roles – observer, expert, and humanitarian – to ignore selective considerations

[2] United Nations International Mine Action Standards, *An Introduction to Mine Risk Education*, 21–22.

(these roles are expanded below).[3] Highlighting the risk of mines/ERW as a humanitarian emergency allows mine action organizations to direct public and donor attention to that particular risk, narrowly focusing on the potential harm and mitigating that potential at the expense of explaining exactly how such mitigation may happen. The "emergency" framework justifies mine-risk education organizations directing their efforts towards community liaison which is less intensive and time-consuming than clearance. Despite direction from the IMAS to move away from large quantitative measures (viz. using the number of people who attend mine-risk education sessions as the primary gauge of success and impact) towards qualitative metrics based in individual cases, there is little reporting of such qualitative community liaison.[4]

Nevertheless, although the global mine-risk education discourse promotes a move *away* from quantitative measures in mine-risk education, rational planning maintains a prominent part in the top-down guidance and shaping of mine-risk education. In the summer

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[3] Andrew Gilbert, "Foreign Publicity, the Democratization Paradox, and the Limits of International Intervention in Bosnia-Herzegovina" (Seminar presented at the Judith Reppy Institute for Peace and Conflict Studies, Cornell University, Uris Hall, March 15, 2012), http://peaceprogram.einaudi.cornell.edu/calendar/index.asp?date=3/15/2012.

[4] Unlike other mine action organizations, Mines Advisory Group terms its mine-risk education teams "Community Liaison teams" (CL teams). The message is that such Community Liaison teams can conduct mine-risk education, rather than vice versa, which is the norm in mine action. Mines Advisory Group's website presents narratives of its CL teams' various successes, but for obvious reasons the challenges and less successful endeavors the teams encounter are not published.

2009 issue of the *Journal of ERW and Mine Action*, two UNICEF and one GICHD staff wrote an article, "Mine-risk education in Mine Action: How is it Effective?"[5] On the subject of community liaison, they write

> It is through this important function that mine-action practitioners engage with communities and seek their active participation in the mine-action process. Without proper community liaison, demining runs the risk of being an isolated activity dealing primarily with the land, but detached from the community for whom the land is actually being cleared. Many practitioners and stakeholders are aware of the extent to which land is cleared, but they do not have a solid understanding of the priority and impact on each segment of the community or the instances where land is unused after clearance due to a lack of confidence in the clearance process.

As this quote shows, linking mine-risk education more closely to clearance activities raises the persistent issue in mine action of "technical" expertise. While "technical" expertise in mine action is assumed to be engineering experience clearing mines/ERW, the *Journal* article shows mine-risk education professionals attempting to frame their work as a necessary supplement to clearance. According to these mine-risk education professionals, clearance is necessary but insufficient to help communities.

In practice, mine-risk education teams' community liaison efforts reinforce the primacy of technical knowledge in mine action. The fact that most mine-risk education teams are from Sudanese NGOs (teams from international NGOs, in particular the Japan's

[5] Baaser, Laurenge, and Filippino, "Mine-risk Education in Mine Action: How Is It Effective?".

Association for Aid and Relief, are all-Sudanese as well), while almost all clearance teams are from international NGOs and commercial contractors, reinforces this hierarchy of expertise and race, and the groups that are able to lay claim to it. Boutros Hobeika, UNMAO's mine-risk education and victim assistance coordinator, states the most important points mine-risk education teams can convey to local communities are that the people are at risk of mine/ERW accidents and some behaviors and actions are safer than others. The technical details of what kinds of mines/ERW are present, the international, national, and organizational standards and procedures for clearance, etc. would not benefit the community as much as direct guidance on what areas are safe (or hazardous).[6] Thus, Sudanese mine-risk education NGOs convey to local Sudanese communities whether outside clearance teams have made the land safe or not and instruct the communities how to manage in the meantime.

Mine-risk education teams direct such instructions to entire groups, but the field of mine-risk education as a whole classifies its target audience along five categories. While these categories are not

[6] Boutros Hobeika, "Interview, Khartoum, Sudan," May 5, 2011. My interview with Mr. Hobeika was conducted in English in which Mr. Hobeika developed fluency after Arabic and French. This statement attributed to him is my paraphrase of a direct quotation in the recording of our conversation. His words were "all you need to tell these people, 'you are at risk. This is what you need to do,' in simple terms, in their language if possible…it's not the business of the community to know the technical, just 'is it safe or not? Can I take my sheep there or not?" I paraphrase this quote to represent Mr. Hobeika's intention and meaning – and all other actors in this dissertation – most charitably.

officially codified in the IMAS, other documents from the UN and the Geneva International Centre for Humanitarian Demining classify mine-risk education audiences as follows:

- "The Unaware (the person knows nothing about the dangers that mines or ERW represent – typical examples are refugees or young children);
- "The Uninformed (the person knows that mines and ERW exist and are potentially dangerous but doesn't know about safe behaviour – typical examples are the internally displaced or older children);
- "The Misinformed (the person has been given the wrong messages or thinks, wrongly, that he or she knows about safe behaviour – typical examples are former soldiers);
- "The Reckless (the victim knows about safe behaviour but deliberately ignores it – typical examples are adolescent boys playing with mines or other explosive devices); and
- "The Forced (the victim has little or no option but to intentionally adopt unsafe behaviour – typical examples are adults in highly-impacted communities who need to forage for food or water for their families to survive)."[7]

As these examples suggest, mine-risk education organizations' use of seemingly universal categories in each country belies the complexity and contingency found in each particular context. One potentially problematic effect of such categorization is that activist-oriented practitioners end up producing static categories divorced from local communities, a charge they actually level at clearance-oriented organizations.

Indeed, in regions like Sudan's Eastern States, which was experiencing the highest number of accidents, these categories are not

[7] United Nations International Mine Action Standards, *An Introduction to Mine Risk Education*, 11–12.

mutually exclusive. The uninformed may include the newly settled (like refugees) but they may also include travelers who routinely drive across long distances. Moreover, such categories do not in fact cover every type of victim: people may be aware, informed, and cautious and still become victims. While these five categories are listed in global level documents, mine-risk educators recognize that in practice, it is with the first three groups that they can expect to effect the most change. Mine-risk education organizations admittedly can do little for the "forced" category. One reason is that mine-risk education teams lack the technical knowledge and capacity to address immediate mine/ERW concerns. As these teams are neither trained to be able to demarcate minefields nor equipped with personal protective equipment, even seemingly straightforward efforts like demarcating a minefield's boundaries or destroying obviously visible unexploded ordnance falls outside the teams' abilities. Another reason is that mine-risk education has no enforcement mechanism; in other words, mine-risk education cannot compel individuals to change their own deliberations and decision-making. Thus, some local communities remain "forced" to take a known risk to collect water or other necessary resources.

Another problem that emerges from this five-fold classification is that its foundation presumes a knowledge gap between "experts" and

"laity." This gap becomes apparent when mine action officials presume authority and profess to have appropriate knowledge about mines, even as one mine action official stated, "mines are victim-activated as well as victim-reported." Many times local communities report an accident and the presence of mines/ERW, which then spurs mine action activities, including mine-risk education. But, such a pattern is one mine-risk education does not always or fully acknowledge.

Returning to Andrew Gilbert's description of outsiders and expatriates in post-conflict areas assuming one of three particular roles: observer, expert, and humanitarian,[8] foreigners as expert humanitarians come into an existing local hierarchy whereby their insignia-emblazoned apparel, new vehicles, and widely perceived high salaries all demarcate a higher social status in post-conflict settings. At the same time, though, these foreigners "still have to occupy the authority role convincingly" to maintain such a position.[9] One way to assert authority is by declaring an area to be dangerous and highlighting risk to a population that has witnessed firsthand decades of civil war. The possibility of a tragedy resulting from ignoring mine-

[8] Gilbert, "Foreign Publicity, the Democratization Paradox, and the Limits of International Intervention in Bosnia-Herzegovina."

[9] Lawrence, "Myth, Memory, and Manipulation: JFK and the Developing World." One element of such a position may be racial, ethnic, or national difference. In mine action, these differences are more accentuated in clearance and less so in mine-risk education. That said, one prominent clearance organization in Sudan is MECHEM, a major South African firm that employs black South Africans and Zimbabweans for some team leader positions in clearance teams.

risk education seemingly ought to lead audiences to heed the message of the mine-risk education team. However, as will be discussed further below, mine-risk education assumes that mines/ERW are the greatest risk and override local people's other concerns. While the mine-risk education field does acknowledge the scenario of "forced" people, the field does not afford "forced" people primacy and maintains its work can affect more people.

Establishing Sudanese Mine-Risk Education

"Such a community liaison approach appears to be the way forward for MRE."[10]

"UNICEF provided support to planning, implementation, and the management of RE at the state and national level. More than 400,000 persons, primarily refugees, IDPs, and communities impacted by mines and ERW, received RE through UNICEF-supported programs in 2010. This included 147,000 through community based presentations, over 150,000 children through school based RE and 103,000 through public campaigns."[11]

I turn now from global level discourse of mine-risk education to mine-risk education as conducted in Sudan. While there is a fair body of literature on mine-risk education written by mine-risk education practitioners for other practitioners, as well as case studies and analyses of individual countries, there has not yet been any published

[10] United Nations International Mine Action Standards, *An Introduction to Mine Risk Education*, 21.

[11] International Campaign to Ban Landmines, "Sudan," in *Landmine Monitor 2011* (Ottawa: Mines Action Canada, 2011), http://www.the-monitor.org/custom/index.php/region_profiles/print_profile/377.

material examining mine-risk education in Sudan. This lacuna stands despite mine-risk education/awareness conducted in Sudan by national organizations since 1998. As the long-running civil war began to reach a ceasefire state in the late 1990s, international donors (principally UNICEF and also others, such as Save the Children USA) gradually increased their funding to Sudanese mine-risk education organizations.

Concurrent with the state of mine awareness/mine-risk education elsewhere in the world, the Sudanese NGOs initially spent the funds donated to them producing materials for "one-way" interactions: "role play(s), songs and games, posters, story books, and videos."[12] While Mines Advisory Group sent one Community Liaison Adviser to the South in 2001-2002, no such efforts existed in the North. At the same time, *Landmine Monitor*'s annual report from 2001 (which covered the preceding year) used the heading "mine awareness," which changed to "mine-risk education" in 2002, reflecting and reinforcing the global shift in this field of mine action.

The 2002 ceasefire between the North and the South allowed a modest increase in humanitarian activities, including mine-risk education, and the UN's response included a mine-risk education

[12] International Campaign to Ban Landmines, "Sudan," in *Landmine Monitor Report 2002: Toward a Mine-Free World Annual Report* (Ottawa: Mines Action Canada, 2002), http://www.the-monitor.org/index.php/publications/display?act=submit&pqs_year=2002&pqs_type=lm&pqs_report=sudan&pqs_section=.

coordinator from UNICEF. For UNICEF, the timing of Sudan's ceasefire and the development of the mine-risk education IMAS seemed a productive coincidence. With a greater mine action presence in country, the UN and a MRE Advisory Group it established "developed a plan and terms of reference for an assessment on mine-risk education to take place in the Nuba Mountains, Kassala and Juba areas. MRE provisional Guidelines and Standards [had] been developed as the basic requirement for accreditation of relevant partners in government-controlled areas."[13] This move towards professionalization in mine-risk education concurrent with the global professionalization movement in mine action broadly presented an opportunity to juxtapose the developments in Sudan with the rhetoric far removed from the ground.

By 2005, the North and South had signed the Comprehensive Peace Agreement, and the UN established its UN Mine Action Office. During the UN's early mine action efforts between 2002 and 2005 in Sudan, however, UNICEF went through three mine-risk education expatriate advisors, with the penultimate advisor arriving in April 2004

[13] International Campaign to Ban Landmines, "Sudan," in *Landmine Monitor Report 2003: Toward a Mine-Free World Annual Report* (Ottawa: Mines Action Canada, 2003), http://www.the-monitor.org/index.php/publications/display?act=submit&pqs_year=2003&pqs_type=lm&pqs_report=sudan&pqs_section=. To clarify, accreditation is the process by which UNMAO and its predecessor office would evaluate all mine action organizations, their teams, and the teams' management to authorize them to work in an official capacity and thus be eligible for international donor funds and to tender for commercial contracts.

and departing in October 2004, and the current advisor arriving in April 2005. *Landmine Monitor* 2005 noted the resultant disruption in mine-risk education programming and included the point "several MRE operators told *Landmine Monitor* that the limited MRE activities during 2004 result from the lack of continuity, poor handover and gaps between advisors."[14]

In subsequent *Landmine Monitor* reports, the mine-risk education sections describe growth in terms of the number of Sudanese mine-risk education organizations, as well as the number of people these organizations reach with the mine-risk education "message." Thus, although global mine-risk education discourse increasingly emphasized community liaison, mine-risk education in Sudan was still largely measured by how widely "one-way" messaging spread. The tension here is similar to the one with surveying described in the previous chapter. On the one hand, there is a *rhetorical* shift towards community-centric mine action. On the other, the functionality of quantification fits within the regime of cost efficiency calculations that encourages one-way messaging.

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[14] International Campaign to Ban Landmines, "Sudan," in *Landmine Monitor Report 2005: Toward a Mine-Free World Annual Report* (Ottawa: Mines Action Canada, 2005), http://www.the-monitor.org/index.php/publications/display?act=submit&pqs_year=2005&pqs_type=lm&pqs_report=sudan&pqs_section=. During my fieldwork in Sudan, I was only able to have limited interactions with the then-current UNICEF mine-risk education coordinator but enjoyed a productive relationship with UNMAO's regional mine-risk education coordinator.

In light of the persistent and relentless demand for information and assessments in mine action, such demands were written into the mine-risk education International Mine Action Standards and applied in Sudan as well. In 2004, Dan(ish)ChurchAid worked with North and South Sudanese NGOs to conduct an assessment in the central Nuba Mountains, and determined "adult men were found to be the most at risk, but some females admitted that they had been to dangerous areas. Children in families fleeing the war had a higher tendency for risk behavior. The assessment suggested four parallel curricula targeting children, adults, IDPs/refugees, and NGO and UN workers."[15] A similar assessment Knowledge, Attitudes, Practices and Behavior (KAPB) commissioned by Save the Children-USA reached similar findings: "that economically active adult males and children constitute 49 percent of the people at risk of mines/UXO in that area. Farming is reported to be the most dangerous activity in the area."[16] I discuss in the next section how mine-risk education efforts in Sudan responded to such findings.

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[15] International Campaign to Ban Landmines, "Sudan," in *Landmine Monitor Report 2004: Toward a Mine-Free World Annual Report* (Ottawa: Mines Action Canada, 2004), http://www.the-monitor.org/index.php/publications/display?act=submit&pqs_year=2004&pqs_type=lm&pqs_report=sudan&pqs_section=.

[16] Ibid.

Field Observations of Mine-Risk Education in Practice

Over the course of seven months as a participant-observer with UNMAO, I observed five mine-risk education sessions across Sudan in Khartoum, South Kordofan state, and Kassala state. In light of the "global" discourse shifts and how mine-risk education in Sudan was portrayed to outsiders, these first-hand observations and interviews provide both an opportunity to examine on-the-ground practices and the application of distant rhetoric to specific locales. I put "global" in quotations because while such discourse may be framed as such by those engaging in it (viz. the UN, GICHD, Europe-based international NGOs, but some national authorities from long-affected countries like Afghanistan and Lao as well), it is global in breadth rather than depth. Many voices are not heard in this discourse, despite the plethora of participants. My research material also allows me to examine the multiple and contested forms of expertise exhibited in mine action and trace how the construction and challenging of different experts reflects the regimes of perceptibility at play in mine action.

My first exposure to mine-risk education "in the field"[17] came in

[17] I found throughout my research that "the field" as a designation is somewhat nebulous. At Cornell, it referred to anywhere beyond Ithaca, New York. In Khartoum, it referred to anywhere beyond the capital. In the three sub-offices located in either a UN compound or in the main urban area, it referred to the various task sites. But even those in Khartoum saw themselves in the field, relative to the colleagues in New York or Europe with whom they were in regular contact. That said, I have been able to conduct this dissertation research while "in the field" and upon my return from any field site.

early February 2011 while accompanying UNMAO's Northern region program officer and one of the quality assurance (QA)/operations (Ops) officers to a village named Kauda in Southern Kordofan state. The QA/Ops officer needed to monitor one of the clearance teams in the area, and the program officer was gathering material for publicity, donor relations, and resource mobilization.

When we reached the village, we learned that many of the local community members had left the area temporarily in anticipation of a demolition by the clearance team being monitored. The village had been attacked with cluster munitions, and the international NGO assigned to the task was nearly ready to detonate the bomblets *in situ* (i.e. destroying the munitions where they were, rather than move them to one central location).

The international NGO did not have a dedicated mine-risk education team but attached a mine-risk education officer, Idris, to the clearance team. This officer's responsibility was to help coordinate the clearance team's work with the community's daily life. In this case, the proximity of the bomblets to people's homes led the mine-risk education officer to take several proactive steps. One was to utilize a USAID-established community radio station to broadcast public service announcements in three languages about the bomblet hazard. The other was to organize a daylong evacuation on the day of the

demolition.

The program officer and I were unable to stay in Kauda for the actual demolition and were required to return to the UN's compound before the community returned to their homes (we later learned that the demolition proceeded without any adverse consequences). On our way back to the helicopter landing spot to return to the UN camp, Idris offered to share the pictures from his digital camera for the program officer to use in funding proposals and other publications. I dutifully copied them as I was carrying my computer.

When I examined the photos that evening, I noticed that even though Idris's most recent experience with the community in Kauda conducting community liaison work was recent, the majority of the 159 photos I copied depicted large audience mine-risk education sessions. There were several close-up images of various explosive remnants of war (sometimes next to a ballpoint pen to give an approximation of scale), but few, if any, images – however deliberately posed – showed engagement in a manner that suggested mutual exchange (Figures 12 and 13). These photos suggested to me that the rhetorical shift that the mine-risk literature described from one-way messaging to mutual collaboration through community liaisons did not necessarily correspond with how mine-risk education teams actually conducted their work on a day-to-day basis.

Figure 14: One of many photos given to me by a mine-risk education facilitator working in Southern Kordofan for the international NGO DanChurchAid. Photo from DanChurchAid. Taken in June 2010.

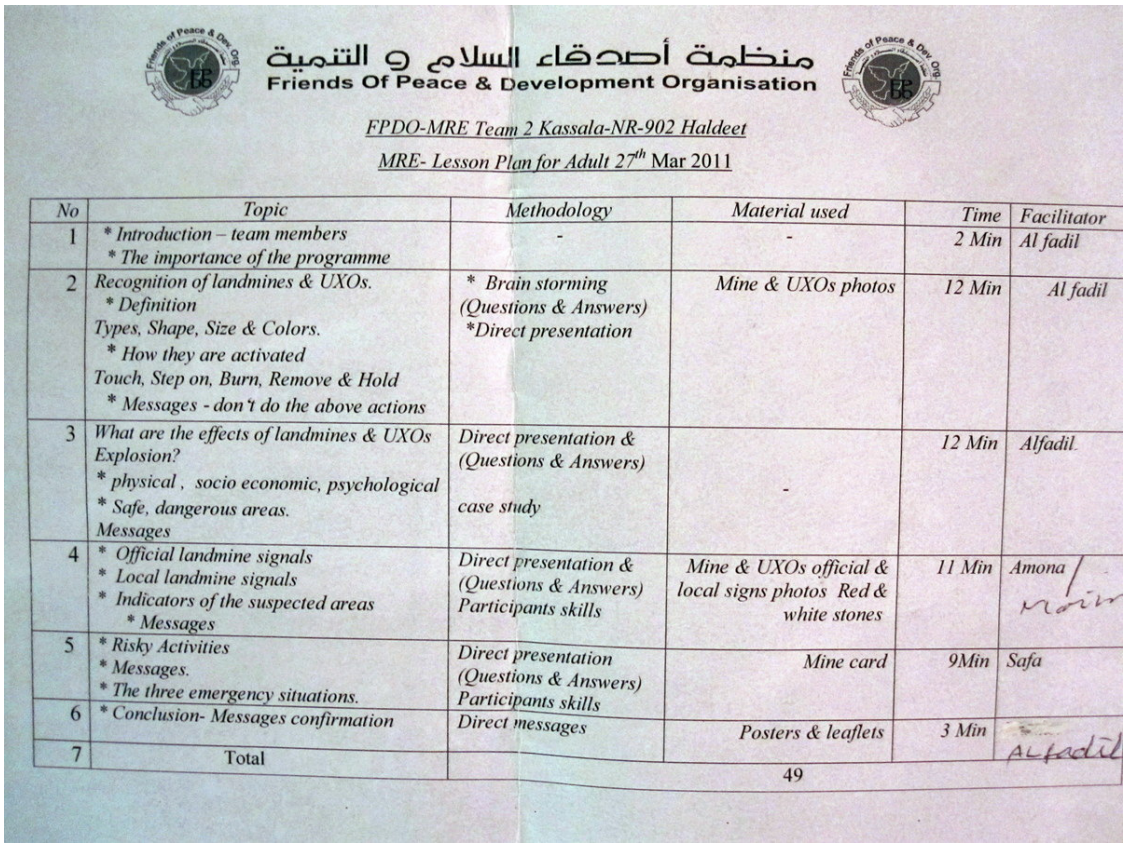
Figure 15: One of many photos given to me by a mine-risk education facilitator working in Southern Kordofan for the international NGO DanChurchAid. (The man with his back to the camera is wearing a cap then distributed in anticipation of South Sudan's referendum and explicitly advocates a positive vote for secession.) Photo from DanChurchAid. Taken in June 2010.

My next opportunity to observe mine-risk education came a month later when I accompanied a Sudanese UNMAO quality assurance officer to monitor a mine-risk education team conducting a session with a local community in Kassala, a state in Sudan's east that borders Eritrea. UNMAO had tasked the NGO to conduct mine-risk education in the area, and this quality assurance visit was required under the National Technical Standards and Guidelines for mine action in the country. UNMAO and the Sudanese NGO

coordinated this visit in advance, and we each took a vehicle to the village. The village was remote, accessible only by dirt roads that would quickly become a challenge during the summer rainy season. The strategy of following power lines for navigation failed here (and in many mine-affected areas), as there is no such infrastructure.

A mine-risk education session follows an organization's standard operating procedure, which conforms to both the UN's International Mine Action Standards and Sudan's National Technical Standards and Guidelines. UNMAO reviews each organization's procedures before it accredits the organization to conduct the work. The mine-risk education sessions I observed were directed towards adults and followed similar lesson plans. After a team introduced itself to the audience, the session included segments on

- recognizing mines/ERW,
- unsafe behaviors with mines/ERW,
- the physical, socio-economic, and psychological effects of mines/ERW,
- identifying safe and dangerous areas,
- learning about the different signs used to indicate mines/ERW,
- what activities may be risky if mines/ERW are present (Figure 16).



منظمة أصدقاء السلام و التنمية
Friends Of Peace & Development Organisation

FPDO-MRE Team 2 Kassala-NR-902 Haldeet

MRE- Lesson Plan for Adult 27th Mar 2011

No	Topic	Methodology	Material used	Time	Facilitator
1	* Introduction – team members * The importance of the programme	-	-	2 Min	Al fadil
2	Recognition of landmines & UXOs. * Definition Types, Shape, Size & Colors. * How they are activated Touch, Step on, Burn, Remove & Hold * Messages - don't do the above actions	* Brain storming (Questions & Answers) *Direct presentation	Mine & UXOs photos	12 Min	Al fadil
3	What are the effects of landmines & UXOs Explosion? * physical , socio economic, psychological * Safe, dangerous areas. Messages	Direct presentation & (Questions & Answers) case study	-	12 Min	Alfadil
4	* Official landmine signals * Local landmine signals * Indicators of the suspected areas * Messages	Direct presentation & (Questions & Answers) Participants skills	Mine & UXOs official & local signs photos Red & white stones	11 Min	Amona
5	* Risky Activities * Messages. * The three emergency situations.	Direct presentation (Questions & Answers) Participants skills	Mine card	9Min	Safa
6	* Conclusion- Messages confirmation	Direct messages	Posters & leaflets	3 Min	Alfadil
7	Total	49			

Figure 16: A lesson plan for a mine-risk education session, observed by a UNMAO quality assurance office. Photo taken in March 2011.

In this mine-risk education session, the team consisted of a male team leader, three female facilitators, and one male driver, all "local" staff (local in the sense of being Sudanese nationals, not necessarily from the Kassala region). While this team did have a male leader, mine-risk education is the only part of mine action in Sudan where women have leadership roles.[18] In parts of Kassala, men and women do not interact openly (in some of the ultraconservative parts

[18] One notable exception is an all-female clearance team in the South organized by Norwegian People's Aid. Unfortunately, I did not have a chance to interact with this team, although their efforts were widely publicized online.

all men and women are segregated by a wall; the only brief interaction married men and women have is at night). NGOs are aware of these restrictions, hence the deliberately mixed gender teams.[19] Because there were no women attending this mine-risk education session, both the male and female facilitators were able to conduct the session. However, if a mine-risk education session is for women in the community, men would not be allowed to be present, unless the community's leader gave explicit permission. Given the smaller proportion of women facilitators, there are fewer mine-risk education sessions for women-only audiences. For the purposes of quality assurance monitoring, the UNMAO quality assurance officer said that while he is sometimes allowed to monitor these sessions, other times his presence is not allowed. Cultural norms largely dictate the QA officer's presence, and beyond the UN's operational requirements for quality assurance, these socio-gender norms directly shape what access people have to certain forms of mine-risk education.

The mine-risk education session began at 12:30 p.m. and lasted approximately an hour. About two dozen men from a Hadendawa tribe arrived. The mine-risk education session was conducted in Arabic, despite the fact Arabic is not the Hadendawa tribe's first language.

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[19] J.B. Russell, "Staff Profile: Helping Women in Sudan," *Mines Advisory Group*, August 18, 2011, http://www.maginternational.org/usa/news/staff-profile-helping-women-in-sudan/?keywords=kassala.

Throughout the session, only a handful of the men in the audience engaged with the mine-risk education facilitators in Arabic, while the rest seemingly listened (though it was not obvious whether the whole group understood the presentation). Some of the exchanges prompted group laughter signifying comprehension; one facilitator joked about the region's famed coffee making by saying "if you find unexploded ordnance, don't put it in the fire to make coffee." When I later brought up this question of linguistic comprehension, the UNMAO quality assurance officer and the mine-risk education team both claimed that mine-risk education can work through diffusion. Mine-risk education professionals reason that those who attended – and comprehended – a session could relay the information to others, included women in their homes and children who were unavailable at the time. While such diffusion could be aided with the variety of posters and printed materials, there did not appear to me to be a ready way to ensure or measure that such diffusion did in fact take place.

The UN quality assurance officer listened to the content of the presentation, but he also was attentive to *how* the mine-risk education team presented the information. For example, facilitators ought to use a pointer to indicate the various photographed mines/ERW on the posters, rather than use their hand or fingers; the rationale was that using one's own body to approach even a picture of a mine/ERW set a

negative example to the audience. Such quality assurance efforts not only ensure consistent and sanctioned information dissemination, but also they reinforce and refine such expertise performances.

After the mine-risk education session, I spoke with the group, with the NGO team leader serving as my translator. They explained to me that this group of Hadendawa tribesmen had settled in the area only two years ago, having moved 5 kilometers (3.1 miles) away from their homes during the war between the Sudan Armed Forces of the North and the Sudan People's Liberation Army of the South (aided by Eritrea). Some of the men in the group reported seeing both SAF and SPLA soldiers putting mines in the ground, and they described an accident four years ago that killed two men. This mine-risk education session was the first time they had received any such information on mines/ERW.

The main idea they wanted to express to me, as a foreigner wearing the trappings of UN staff (ID badge, shirt with an emblazoned logo, riding in a white 4x4 vehicle; in contrast, the Sudanese UNMAO quality assurance officer had nothing that marked him as affiliated with the UN other than arriving in the same vehicle as me),[20] was that

[20] I can only infer that presenting myself as belonging to the UN was what motivated and structured out interaction and discussion on what this group of men said their community needed. It was by chance that the Sudanese QA officer did not have his badge with him that day, and as the UN did not have a compound in Kassala where the UNMAO office would be based, a badge was not required to complete daily job functions.

their concerns about mines/ERW in the area led them on a lengthy detour to collect water. As the community had not had an accident, it became clear that they had already established which areas they thought were dangerous. Their primary concern seemed less about clearing of the mines than the accessibility of functioning sources of clean water.[21]

Later in a separate interview with this same mine-risk education team, I asked them about a part of their lesson I had heard in other mine-risk education sessions (including the one for new UN staff in country): "If you see one landmine, stop! Do not move any further, and do not try to retrace your steps. You are in a minefield! Call out a warning to any nearby for them to stop, and try to contact help." The wording was almost identical in both contexts.

The response from the team (and other mine-risk education professionals) was that mine action is complicated, and one of the goals of mine-risk education was to simplify mine action's message for non-experts. The intricacies of land release (discussed in chapter three) and the various negotiations involved in prioritization and resource allocation are all stripped out; the message becomes boiled down to "our job is to tell people if it is safe or not." In this regard, mine-risk education lacks any element of community participation:

[21] Any other UN assistance would most likely require some assurance or certification that the area did not have a mine/ERW risk.

organizations are unwilling and/or unable to spend the time and resources to explain the clearance work processes to communities and subsequently bring those communities into the clearance process. Moreover, this particular organization did not have UNMAO accreditation to do community liaison work, and its mine-risk education activities were limited to information sessions that draw less on the "technical" information that community liaison efforts engage and more on generalized, non-specific warnings. In an interview with another Sudanese UNMAO quality assurance officer, his expectation for proper mine-risk education was that these teams provide "general" rather than "technical" information.[22] That's it, *khalas* (a widely used Arabic idiom signifying finality; a more definitive expression of "that's it"). Such a distinction by a UN official between general and technical knowledge – absolute safety being the metric of the former and relative risk of the latter – fits neatly within the existing idea of who is an expert and who is not. Perhaps more significantly, experts take it as obvious what the benefits are for communities to have their land cleared and used. Moving beyond that idea for the communities seems unnecessary, argue the experts.

At the same time, in mine-risk education and across mine action as a profession, practitioners argue that all mine action organizations

[22] Wajdi Agrab, "Interview, Kassala, Sudan," April 10, 2011.

"need" local communities. As one clearance team manager often repeated to me, "we only work with information." Landmines and other explosive remnants of war are indeed victim-*activated* (viz. a victim's often innocuous action – merely taking a step – is what causes the harm), but the lack of infrastructure in Sudan means that they are also largely victim-*reported* (i.e., a victim brings herself to the attention of relevant authorities). Moreover, mine action only "works" if local communities actually use the released land. A senior UN official stated what many other mine action actors often repeated to me: "there's no sense releasing land if people aren't confident using it. That's why you use community liaison or mine-risk education to balance between releasing land and community confidence."[23] Such an artificial separation of a key issue in mine-action – communities' simple acceptance or rejection of land that outside organizations clear – serves mine-risk education professionals who subsequently offer their expertise as a means to resolve a complex impasse like community acceptance of cleared land.

The issue of expertise also emerges from this risk aversion, in part because it is not clear whether a mine-risk education team does in fact understand the contingencies involved in land release and is able to articulate them to local people. Reminiscent of Donald

[23] Stephen Fantham, "Interview, Khartoum, Sudan," April 28, 2011.

MacKenzie's certainty trough,[24] mine-risk education presents a firm certainty whereas other organizations in mine action emphasize "we don't clear to 100%" or "in this business, you say '99.6%'."[25] Mine-risk education teams function in some ways as boosters for clearance activities, and in their "sell," the caution – and even at times tentativeness – of articulating clearance fades in the effort to ensure community buy-in and acceptance.

Later that month, I observed an international NGO's mine-risk education team conducting informal briefings in Kassala. One briefing took place near a water well where women and children were filling their containers. Given the gender roles and expectations of the local people who lived in the area, the female team leader was the only one who approached the well while the other team members, who were all male, and I stayed with the vehicle at a distance (female leaders of mine-risk education teams are not uncommon, even in Sudan). The team leader carried a laminated book with large photos of common

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[24] Donald MacKenzie, *Inventing Accuracy: a Historical Sociology of Nuclear Missile Guidance* (Cambridge: MIT Press, 1990), 370.

[25] Steve Brown, "Mine Action - The Management of Risk," *The Journal of Mine Action* 3, no. 1 (Spring 1999), http://maic.jmu.edu/Journal/3.1/features/risk_brown/risk_brown.htm. Brown discusses why 99.6% and certainty in clearance are problematic. The figure 99.6% was a key feature of the early iterations/versions of mine clearance standards. 99.6% is largely symbolic, meant to signify that clearance is never absolute but should be done to such a degree as to leave all parties highly confident that the area is now safe. 99.6% is no longer codified and has been replaced with the language of "all reasonable effort." The mentality and notion of a lack of certainty or guarantee is one that still remains for many mine action actors. I will return to this issue of certainty in clearance in the next chapter.

mines/ERW in the area to illustrate her warnings and show what items ought to be brought to authorities or experts' attention. During this briefing, some boys approached us, and the team members readily distributed posters (Figures 17 and 18). These posters depicted characters who resembled the "audience" in terms of physical appearance and clothing.

Figure 17: A female mine-risk education facilitator approaches a group of women and children. This photo was taken at a distance, per cultural norms on gender interaction. Photo taken in March 2011.

Figure 18: A mine-risk education facilitator describes a culturally-adapted poster to a group of young boys before freely distributing additional copies. Note the poster character's skin tone and clothing. The young girls in the previous figure who were in the area remained with their mothers and did not approach any of the men in the MRE team. Photo taken in March 2011.

After the conversations around the water well, the team encountered a gathering of Hadendawa men and offered a full mine-risk education presentation. The female team leader discretely maintained her distance away from the men throughout the team's interaction with the gathering. While this presentation was not planned and coordinated like most mine-risk education activities (although it is not uncommon for mine-risk education to be spontaneous and ad-hoc), the team proceeded with their well-established and practiced lesson plan.

It was not until the end of the mine-risk education session that day I observed the team functioning as the "eyes and ears" of clearance organizations and UNMAO/national authorities. When the team asked the crowd if they had ever seen any of the mines/ERW depicted on the various posters, two of the men mentioned a stray bomb several miles away. The team asked the men if they could direct the team to the munition, and with the two men in the passenger cab of the team's pickup truck (and the rest of us riding in the truck bed), we drove for several minutes into a wide clearing where we indeed found a single piece of unexploded ordnance. The team took GPS readings of the lone, seemingly stray munition, and gathered rocks into a pile to spray paint them red. The location and item description went to the organization's office and then to UNMAO. UNMAO would then at some

point in the future task a clearance organization to destroy or dispose of the munition. Given the munition's remote location, seeming lack of impact on any community, and the mine-risk education team's marking, such a task was a low priority.

Figure 19: A mine-risk education team conducts community liaison work, noting the GPS coordinates of an explosive remnant of war and fashioning a warning marker. Photo taken in March 2011.

In analyzing these various mine-risk education activities, anthropologist E. Summerson Carr's point that "expertise is something people do rather than something people have or hold" reiterates a longstanding STS finding.[26] In mine-risk education, "expertise requires the mastery of verbal performance, including – perhaps most importantly – the ability to use language to index and therefore

[26] E. Summerson Carr, "Enactments of Expertise," *Annual Review of Anthropology* 39, no. 1 (2010): 18, doi:10.1146/annurev.anthro.012809.104948.

instantiate already existing inner states of knowledge."[27]

Nevertheless, even if such a verbal performance is supplemented with uniforms and other visual media (see figure 20 below),[28] I want to highlight that such linguistic ability is necessary but ultimately insufficient for demonstrating recognized expertise. Mine-risk education teams in Sudan are indeed able to speak to an audience's knowledge of long-lasting war and the mines/ERW that remain littered across the terrain, but most of the Sudanese population are already aware of the potential of mines/ERW to be a post-conflict concern. While communities returning to their homes after fleeing fighting may not know precise locations of mines/ERW that could potentially await their return, neither do mine-risk education teams. Thus, such a linguistic ability is insufficient in part because of an organizational hierarchy within mine action in which clearance organizations and the individuals with clearance experience challenge mine-risk education's expertise, or even disregard such work.

[27] Ibid., 19.

[28] Ibid.

Figure 20: A mine-risk education facilitator' wears a pink smock emblazoned with a sponsoring organization's emblem and uses a poster annotating pictures of warning symbols during a mine-risk education session. In a moment of reflexivity, I am aware of the glut of jargon and acronyms in my own work on this subject. Photo from UNMAS. Taken in June 2009.

Critiques of Mine-Risk Education

Like the other dimensions of mine action, mine-risk education faces a fair amount of criticism and critique, primarily from within the field and not only from those slightly further away from its core activities or the audience to whom public relations and media staff direct their efforts (viz. donors). Such criticism centers on three separate but interrelated points: 1) competition between different forms of expertise; 2) the dominance of clearance's paradigm in the hierarchy of mine action; and 3) uneven and unstable power dynamics of a postcolonial Sudan interacting with outside institutions. In the previous chapter on the Landmine Impact Survey, I discussed the

juxtaposition of nontechnical-technical work. This tension reemerges in mine-risk education as those who purport to be experts are challenged by others in mine action, namely those in higher social positions in the mine action field.

The point of expertise that Carr and many others make is "enactment of expertise not only determines the value of cultural objects" – in this case mines/ERW – "it also confers value on those who interact with these objects, including the experts so enacted." Taking Joseph Dumit's concept of "expert objects" as objects that present occasions for the execution of expertise,[29] the object for mine-risk education is the environment whereas for clearance it is a more circumscribed area (ideally, the smallest possible one). Consequently, a crude demarcation between the primary object of mine-risk education and that of clearance is the former is about people, the latter about mines.[30] Mine-risk education centers on an expertise in mine/ERW risk *avoidance* whereas clearance focuses on mine/ERW risk *reduction* (which some actors would frame as risk elimination).

The distinction between risk avoidance and reduction, arguably a false dichotomy, underpins Rae McGrath's scathing critique of mine-

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[29] Joseph Dumit, *Picturing Personhood: Brain Scans and Biomedical Identity* (Princeton N.J.: Princeton University Press, 2004), 16.

[30] While clearance has attempted to shift its base metric away from numbers of mines or square meters, these two quantities still largely define clearance work and remain the only common unit of analysis. Indeed, a common rhetorical question in mine action is "do you want to clear mines or do you want to clear land?"

risk education in his *Landmines and Unexploded Ordnance: A Resource Book*, published in 2000. While more than a decade old, much of the criticism is echoed in critiques of contemporary mine-risk education in Sudan.[31] McGrath wrote:

> *on the scale and in the format presently employed by many organisations are a damaging misuse of funds which could be put to better use surveying, marking and clearing minefields* (emphasis in original)…they provide an opportunity for many organisations and individuals, with none of the engineering skills necessary to respond directly to landmines, to be involved in one of the major issues of our time…but understanding why the mine-awareness phenomenon happened does not change the fact that it is, in general, an inappropriate, wasteful and, often, paternalistic and culturally insensitive response.[32]

McGrath offers the following hypothetical to illustrate how he views mine-risk education: "let me suggest a scenario where teams of educationalists and veterinarians (and perhaps butchers) from Nicaragua, Afghanistan and Angola [countries with long-standing mine/ERW contamination] had arrived in England at the height of the mad-cow disease crisis and launched similar awareness initiatives."[33]

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[31] Rae McGrath co-founded Mines Advisory Group with his brother Lou (who only recently retired as chief executive of MAG due to health concerns), and MAG was an early part of the International Campaign to Ban Landmines. When the 1997 Nobel Peace Prize was jointly award to Jody Williams and the ICBL, McGrath delivered the Nobel lecture on behalf of the ICBL. MAG has become one of the largest NGOs in mine action, although its presence in (North) Sudan was constrained by the Government of Sudan's near categorical distrust of international NGOs. Moreover, the Government of Sudan consistently harassed and hampered such NGOs' work and periodically confiscates (or steals, depending on one's perspective) NGOs' equipment and property.

[32] McGrath, *Landmines and Unexploded Ordnance*, 193.

[33] Ibid., 197.

His hypothetical draws upon an expected culture clash, between a group that has direct experience with the issue at hand (mines/ERW or mad-cow) and an outside group that purports expertise in a field that cannot offer a working solution (mine-risk educators or butchers). It is also important to note that mine-risk education organizations are far more likely than clearance organizations to be national (as opposed to international) and managed by national staff. Yet at the same time, McGrath's invocation of Nicaraguans, Afghans, and Angolans attempting to provide unhelpful advice to English citizens is a reversal of what he currently sees in mine-risk education: wealthy foreigners telling local populations how to manage a humanitarian problem they already know and experience firsthand. It is this sort of imposition that leads McGrath towards charges of paternalism and cultural insensitivity (which I will address below). It also, on a very rudimentary level, highlights a particularly disparaging critique of mine-risk education from one of the world's most prominent figures in mine clearance.

Such critique is rooted in the question of mine-risk education's inefficacy, the most consistent charge against mine-risk education organizations. "Knowledge, Attitudes, Practice" studies, a mainstay in evaluations of humanitarian work broadly construed, and surveys across other mine/ERW-affected countries reinforce mine-risk

education's classification of the "forced" population sub-group: if an individual or group experiences a socio-economic pressure, they will knowingly take the risk of traveling through a suspected or confirmed hazardous area. In other words, no amount of mine-risk education can prevent people who deem the potential risk of being a mine/ERW victim to be less than the certainty of dehydration, starvation, or death by other means. Within Sudan, approximately half of all landmine survivors report having received mine-risk education (which is not a publicized fact but widely recognized within the mine action community). Fortunately, there are not a lot of landmine victims in Sudan (or globally, for that matter), relative to the total population size, extent of the civil wars, and other causes for severe illness and harm.[34] And this 50% statistic is a far better outcome than 50% of people being victims/casualties. Put another way, a proportion of mine/ERW casualties will always include individuals who received mine-risk education; such is the nature of risk. The question remains how large or small that proportion is.

Another critique of facing mine-risk education – and mine action more broadly – centers on the lack of "success" indicators, and related,

[34] While UNMAO's official figure of 1651 mine/ERW casualties and survivors from 1964 through 2010 is certainly an underestimate, the orders of magnitude between this figure and the estimated two million dead and millions more displaced from their homes and communities are one context-shaping consideration constantly facing mine action efforts. See International Campaign to Ban Landmines, "Sudan"; Cockett, *Sudan*, 1.

the attribution problem whereby mine-risk education organizations cannot precisely attribute the observed results to their actions.[35] Given that mine-risk education organizations conduct "activities which seek to *reduce* the risk of death and injury from mines and ERW,"[36] they recognize there will nonetheless be some mine/ERW victims who did receive mine-risk education. At the same time, mine-risk education organizations are unable to respond to criticism with quantified metrics. Ted Paterson, head of the evaluation and policy research section of the Geneva International Centre for Humanitarian Demining, wrote in a 2005 "state of the field" publication that

> If MRE is well targeted, it presumably is being delivered to the most vulnerable communities. In this case, we might find the numbers of accidents in communities receiving MRE has remained higher than those having no MRE, but we could not safely conclude that MRE is not working. This is termed the 'attribution problem' – we cannot attribute the results observed

[35] Perhaps the low costs of mine-risk education relative to clearance contributes to international donors' willingness to continue funding mine-risk education regardless of clear, "evidence-based" indicators. Because clearance is a far greater expenditure, donors are more concerned with the efficacy and efficiency of how larger amounts are spent. According to UNMAO's Multi-Year Work Plan from November 2010, which lays out the funding requirements to meet annual benchmarks/milestones for Sudan to meet its obligations under the Mine-Ban Treaty to be free of mines/clear known mines/ERW by 2014, mine-risk education has secured only 4% of the funds necessary for its work (US$260,000 of US$6,460,000). Compared to the 25% survey and clearance has secured (US$18,691,000 out of US$76,379,000), mine-risk education has a clear secondary position in mine action's hierarchy. United Nations Mine Action Office, *Sudan Mine Action Sector Multi-Year Work Plan 2010-2014* (Khartoum, Sudan: United Nations Mine Action Office (Sudan), November 30, 2010), 27. The pressure to provide success indicators stems large from within the mine action field and its on-going efforts to maintain its own professionalism.

[36] United Nations Mine Action Service, *IMAS 12.10 Mine/ERW Risk Education, Second Edition*, 8. Emphasis added.

to the actions of the programme.[37]

Mine-risk education's "earlier" quantification efforts to tally the number of individuals who "receive" mine-risk education did not engage with questions of efficacy under the rationale of being an emergency effort (evidenced across a wide variety of international interventions and fields, including medicine). "Later" efforts towards qualitative community liaison work was a deliberate shift away from questions of quantification by working in such a way as to produce concise narratives illustrating mine-risk education's work and leaving the inference that such work was generalizable and replicable if conducted by the same organization.

While it may seem that mine/ERW clearance has ready measures of success – each mine/ERW found and destroyed is putatively a life saved – and mine-risk education lacks such measures, these two areas of mine action, while distinct, are not opposites. McGrath's assertion of clearance's primacy challenges the other dimensions of mine action. Other actors, including the UN quality assurance officer I accompanied on a quality assurance visit, discuss mine-risk education's responsibility to give "general" rather than "technical" knowledge. This is possible because while mine-risk

[37] Geneva International Centre for Humanitarian Demining, *Mine Action: Lessons and Challenges*, 332.

education's main purpose is a rapid, less costly wide scale response, it ultimately assents to clearance, ceding authority. Mine-risk education organizations, teams, and individuals lay a claim to educational or liaison expertise, an expertise that does not remove the threat of mines but instead is based on how local people and communities can avoid the threats and risks. It is this point – that mine-risk education can not remove explosives – that critics of mine-risk education emphasize.

McGrath et al's hierarchy of capability speaks to Carr's contention that "expertise emerges in the hoary intersection of claims about types of people, and the relative knowledge they contain and control, and claims about differentially knowable types of things."[38] Mine-risk education hinges on populations that are ignorant of mines, and to an extent, this is accepted both in the mine action field and among local communities. Given the decades of protracted civil war between intractable belligerents, many civilian populations had very little agency or control over their lives and livelihoods for a significant portion, if not the majority, of their lives. With respect to mine action, there are few, if any, reports of local communities deliberately attempting to remove mines/ERW themselves.[39] Discussions and sometimes disputes arise over mine locations, but not of the handling

[38] Carr, "Enactments of Expertise," 22.

[39] "Village demining" as it is termed within mine action is prevalent in Southeast Asian mine/ERW-affected countries.

and removing of the explosives. Mine-risk education reinforces this last point and becomes a means of reinforcing the expertise of clearance.

Some Sudanese communities have also voiced their stronger preference for clearance over mine-risk education. During a mid-year status update meeting between UNMAO and Sudanese officials in early 2011, one UNMAO official brought forward the point that communities in Kassala state "were sick of mine-risk education" and were responding to mine-risk education teams "to go ahead and clear our mines." This was a marked departure from public media accounts of Sudanese communities that express gratitude for any mine action intervention, including mine-risk education. The UNMAO official made this point in part to suggest that UNMAO and Sudanese officials prioritize Kassala over the other two mine-affected states, Blue Nile and Southern Kordofan. Kassala had the greatest number of accidents in part because Blue Nile and Southern Kordofan were surveyed earlier and more thoroughly, with the dangerous areas demarcated longer.

All of these concerns are couched within the legacy of colonialism. This legacy, to some degree, is perpetuated in McGrath's account of cultural insensitivity embedded within mine action, and Sudan's recent history as a colony of England and Egypt only

accentuates such concerns. While the specter of colonialism looms over the large international presence in Sudan in the form of the UN's peacekeeping mission, African scholars and commentators also note local citizens and institutions have a role and responsibility in creating a viable state. As I discussed in the introduction, perhaps as equally pernicious as colonial subjugation is what Binyavanga Wainaina describes: "at some point you kind of start to understand that the soft power, the good of the NGOs, to some degree, allows the laxity of our own civil public, of our own institutions, of our own government to do the job they're supposed to be doing."[40] Some of the failures of the modern Sudanese state can be linked back to the English-Egyptian "condominium" arrangement discussed in the introduction. Yet, at the same time, mine action organizations perpetuate, to an extent, the state's failures to clear mines/ERW laid by government soldiers and local communities' limited agency in potentially addressing such threats .

A closer examination of the passages cited above also reveals a dominant primacy of universalist engineering: that military engineering expertise is the proper corrective to mine/ERW contamination. In effect, McGrath's efforts at problem-simplification

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[40] *Response to "How to Write About Africa" by Binyavanga Wainaina - Part 1 of 3*, 2008, http://www.youtube.com/watch?v=3d9qlHW8_3s&feature=youtube_gdata_player.

allow only one type of response: namely a technical solution. The problem, for McGrath, is simply that there are mines/ERW in the environment, and the solution is obviously to remove them. There is little, if any, room to reform mine-risk education because of the primacy of removal. Accordingly, cultural paternalism is replaced with a calculating and "objective" engineering expertise which, in McGrath's formulation (and many others), is both translatable and effective. Yet, as Anna Geltzer has shown in her analysis of evidence-based medicine in post-Soviet Russia, deploying such expertise and claiming an ability to speak on behalf of the evidence "reduce(s) the potential for conflict and mask(s) the power differential" between the expert and the non-expert.[41] However, such discourse does not wholly eliminate power differentials in these social relations,[42] and there still a remains a space for mine-risk education to attempt another formulation of the mine/ERW problem. Thus, MRE issues a controversial challenge to the dominant clearance regime by expanding and complicating how this regime frames both the problem and the solutions. Articles by mine-risk education professionals such as Baaser *et al* explain mine-risk education's place in mine action as both awareness raising initiatives and a short-term response to mine/ERW accidents until a

[41] Anna Geltzer, "Surrogate Epistemology: The Transition from Soviet to Russian Biomedicine (Ph.D Dissertation)" (Cornell University, 2011), 174.

[42] Ibid., 175.

clearance can be conducted; they also justify mine-risk education activities in part by pointing to its role in assisting clearance teams through community liaison work.

Expanding and analyzing criticism of mine-risk education is not, for me as an analyst, to advocate a technologically deterministic perspective. While it is possible to read one part of McGrath's criticism as arguing for engineering's inherent superiority over mine-risk education, the main thrust of such criticism reflects the socio-technical choices each group makes and how my actors understand and subsequently valorize what is "technical." The choices mine-risk education organizations made had consequences for their work and place within mine action. Costs, speed of deployment, scope of intervention, required infrastructure, and other pragmatic concerns all factored into the decisions described above. The result of such decisions is that mine-risk education lost its ability to claim primacy in mine action.

Conclusion

While the whole field of mine action publicly describes how different organizations and pillars work together to address the problem of mines/ERW, I have argued in this chapter that the power dynamics between different organizations have unintended

consequences on the ground. Mine-risk education is one technology, broadly defined, employed to address mines/ERW, but the challenges mine-risk education organizations and their teams face are not only because this technology is "social" while clearance is "technical." Beyond the material aspects of explosives hidden in the ground, the way organizations and their teams enact and perform their expertise – and as stated earlier, thus exercise power – through mine-risk education has implications for what happens for local communities facing contaminated landscapes. With this chapter, I again illustrate that simply removing mines/ERW out of the ground is more complicated beyond any good intentions. At the same time, mine-risk education continues to privilege clearance, reinforcing some of the challenges I will discuss in the next chapter.

CHAPTER 3: THE DOMINANCE OF CLEARANCE

Introduction

Clear the whole area. All of it. Now. Someone could get hurt or killed. A kid. A woman collecting wood. Me.

I remember that train of thought the first time I accompanied a clearance team into a minefield to observe their work.[1] On some level, the mandatory briefings at the team's base – one for me as a visitor, and one by the team's manager for his deminers – had been straightforward and were not any cause for alarm. Putting on personal protective equipment – a Plexiglas visor and Kevlar apron with my name, blood type, and insurance information visible from the front – seemed sensible as everyone else was doing it as well. But standing in the middle of a mined area with deminers working ever so carefully and deliberately started to make me anxious. Sure, I was in the same heat as everyone else, but all I was doing was standing in a cleared area next to a supervisor taking notes. I was not the one kneeling or putting my body a few inches away from a potential explosive. Hurry

[1] "Minefield" is an imprecise term that describes any area of land that contains more than one landmine that may or may not be buried in a pattern. Thus, in Sudan and in other countries, minefields are wide swaths of land around a military installation with the mines laid in a systematic pattern as well as the shady area under a few trees along a footpath used by villagers. United Nations Mine Action Service, *IMAS 4.10 Glossary of Mine Action Terms, Definitions and Abbreviations, Second Edition*, 2003, 25, http://www.mineactionstandards.org/fileadmin/user_upload/MAS/documents/imas-international-standards/english/series-04/IMAS-04-10-Ed2-Am4.pdf.

up and make the area safe. Do what needs to be done. Be safe though. Lives are at stake. For many people, the idea of landmines and other explosive remnants of war hiding in a landscape is a terrorizing idea and leads to an understandable "get it out, now!" reaction.[2] All of the "overly cautious" messaging in mine-risk education suddenly felt like it made a lot of sense.

[2] "Get it out, now!" comes from The HALO Trust, one of the oldest and most established mine action organizations, based in the U.K. (HALO is an acronym for "High-risk Area Life-saving Organization"). HALO's official motto is "GETTING MINES OUT OF THE GROUND, NOW." While HALO does not work in Sudan for a variety of reasons (see Matthew Bolton, "Sudan's Expensive Minefields: An Evaluation of Political and Economic Problems in Sudanese Mine Clearance," in *Human Security and Mine Action Discussion Paper* [presented at the Centre for the Study of Global Governance, London School of Economics and Political Science London School of Economics and Political Science, 2008].), many key UNMAO officials spent a significant part of their mine action careers with HALO. HALO's motto regularly came up in conversations, both as a deliberate invocation of the organization as well as an explanation for a particular course of action (doing something in order to "get mines out of the ground"). In some slightly humorous exchanges, the utterance "comma now" would indicate deliberateness and haste.

Figure 21: A Sudanese manual deminer. Photo from UNMAO. Taken in December 2009.

The figure above is one representation of mine/ERW clearance: a solitary figure (in the case of Sudan, always a man, usually with current or previous military training), wearing specialized protective equipment, scanning and probing the ground, inch by inch. While we may not consider the self-positioning of the deminer in front of a potential explosive to be wholly voluntary,[3] the equipment denotes expertise and authority. His highly structured and ritualized motions

[3] A deminer's salary is approximately US$300 a month, a significant sum in a largely poor country where a falafel lunch is US$0.17 and a day's worth of bread for a family costs less than US$0.50.

convey experience.

The individual gestures of the deminer's movements speak to the experience conveyed in his work are situated within what I have been describing throughout this dissertation as the clearance-oriented regime of perceptibility within mine action. Yet, this regime, while dominant, is far from static, and the clearance-oriented regime is comprised of many different ways of comprehending mines/ERW in the environment and the various subsequent reactions. Key among these is the international codification of "land release:" an effort to document clearance efforts performed by experts and to introduce evidence-based decision making through increased documentation of in-the-field choices towards clearance.

Despite – or potentially given – this expertise, accidents during mine clearance occur regularly. Using accidents as analytical openings has long been a methodological mainstay of STS,[4] and in the case of mine action, these accidents can be doubly unfortunate. The obvious misfortune for a deminer is apparent, but in some cases, what is revealed by the accident and subsequent investigation is also troubling. However, I argue that although mine/ERW accidents in

[4] One exemplar of studying an accident to reveal the underlyind dynamics of the context surrounding the accident is Diane Vaughan, *The Challenger launch decision: risky technology, culture, and deviance at NASA* (Chicago: University of Chicago Press, 1996). Accidents are one key subset of "controversy studies" within STS. See Pam Scott, Evelleen Richards, and Brian Martin, "Captives of Controversy: The Myth of the Neutral Social Researcher in Contemporary Scientific Controversies," *Science, Technology, & Human Values* 15, no. 4 (1990): 474–94.

uncleared areas are unfortunate, such incidents ultimately bolster UNMAO's continued appeals for increased donor funds in an effort to minimize, if not eliminate, them. Far more troubling to donors, mine action organizations, and the people who use cleared land, however, are missed mines: mines/ERW found in an area deemed cleared that sometimes result in injuries and/or deaths. While such accidents could potentially derail and delegitimize UNMAO's efforts, the brief history of UNMAO's work in Sudan reveals that such incidents have not in fact halted or significantly challenged UNMAO's ability to continue its work.[5] In other words, accidents can both challenge and bolster UNMAO's expertise and efforts.

In examining the work and "expertise" of the UN Mine Action Office, I argue that such incidents are incorporated into several different aspects of the office's efforts in such a way as to be normalized within the clearance-oriented regime of perceptibility. A recognition of nature's agency and the power dynamics of geopolitical institutions all factor into how the mine action office manages potentially delegitimizing incidents. UNMAO has actively constructed a regime of perceptibility whereby these incidents are both anticipated and "explained away" in such a way that contingencies, rather than a systemic issue, is at fault.

[5] I use incidents rather than accidents because not every missed mine resulted in an injury or death. Some missed mines have been discovered before any harm occurred.

My argument is not meant to detract from the laudable life-saving efforts of UNMAO, other clearance organizations, and the people who undertake such work. Analyzing UNMAO's efforts is a way of articulating how the life-saving efforts are highly contingent upon regimes of perceptibility that give primacy to what is familiar, technological, and material. In doing so, I address some of the less-often asked questions about this large-scale technological endeavor: "whose goals do these clearance technologies serve? What political and economic interests shape the design and use of complex technological systems? And what assumptions about the natural world and human–natural relations are embedded in these technologies?"[6]

Institutionalizing Clearance in Sudan

Official accounts of Sudan's second civil war frame the conflict as spanning from 1983 to 2005 (with a ceasefire in place from 2002) with both the Northern and Southern militaries laying mines against the other side's soldiers and civilians. While military engineers on both sides were trying to clear mines the other side was laying, such clearance was almost exclusively to achieve military objectives. It was not until 1996 when the Southern Sudan People's Liberation Army declared a moratorium on landmines and the Northern government

[6] Sara B. Pritchard, "An Envirotechnical Disaster: Nature, Technology, and Politics at Fukushima," *Environmental History* 17, no. 2 (April 1, 2012): 221, doi:10.1093/envhis/ems021.

signed the Mine Ban Treaty a year later that humanitarian mine action efforts began. Each side then began to conduct its own clearance for civilians, but without explicit adherence to the International Mine Action Standards, their efforts were not recognized as effective by other mine action and international organizations, and the areas were resurveyed and recleared by later organizations. While some of these clearance efforts had some UN funding before the UN began conducting and coordinating clearance itself in 2002, the UN later deemed Sudanese clearance unacceptable and resurveyed those areas.[7]

The 2002 cease-fire agreement in place between the North and South enabled the UN's World Food Programme to begin the UN's first large-scale clearance efforts by contracting with MECHEM, a South African commercial mine action company, to clear the major roads in Sudan to facilitate food aid delivery. Mine action efforts steadily increased along with other humanitarian relief efforts, and the 2005 Comprehensive Peace Agreement allowed the establishment of the UN Mission In Sudan (UNMIS), the UN's most expensive peacekeeping mission to date.

As a part of the UNMIS, the UN Mine Action Office (UNMAO) was

[7] I was unfortunately unable to find detailed information about these efforts as many of the Northern and Southern Sudanese organizations never kept detailed records and have dissolved due in part to the increasing role of international organizations.

responsible for all mine/ERW activities. With respect to clearance, UNMAO evaluated and issued accreditation to commercial organizations,[8] nongovernmental organizations, platoons from various countries' militaries that serve as peacekeepers in the UN Mission In Sudan, and Joint Integrated Demining Units (JIDUs), designed to be a combination of soldiers from the North and South working together to demine each other's territory as a peacebuilding measure. One JIDU team operated independently while other JIDUs worked under the management of a commercial contractor. While I was unable to obtain specific figures on the proportion of Northern and Southern soldiers in these units, some of the JIDUs I encountered were comprised entirely of Northern Sudanese.

In addition to these JIDU teams, several platoons of soldiers serving as "peacekeepers"[9] from UNMIS also conducted humanitarian

[8] The commercial contactors in Sudan include MECHEM, MineTech International (MTI), Minewolf, RONCO Consulting Corporation, and The Development Initiative (TDI). MECHEM is a wholly owned subsidary of South Africa's Council for Scientific and Industrial Research (which partnered with NASA to operate one of its Deep Space Network stations during the Cold War). TDI split off from MTI as a separate company. RONCO was acquired by G4S, a global security services company, in 2008. Interestingly, G4S also works as a commercial mine action company with its own UN contracts in South Sudan. Additionally, in 2008, G4S acquired ArmorGroup, another commercial mine action company with its own UN contracts in the South as well. Beyond its mine action business, G4S has contracts (some infamous) in the U.S. and across the globe to provide security to major international airports, government facilities, nuclear power plants, the London 2012 Olympics, and Cornell University's Johnson Museum of Art. Like many other security companies, G4S has not escaped criticism and controversy on a wide variety of issues, although I did not encounter any specifically about its mine clearance work in South Sudan (not to say none exists).

[9] I use "peacekeepers" in quotes in light of their major failings to protect civilians. The most notorious case in UNMIS was in 2011 when Zambian soldiers remained in

mine/ERW clearance. These two groups, however, contributed a very small percentage of the cleared land in Sudan. (One task I performed for UNMAO was compiling a comparative cost-efficiency matrix of all of UNMAO's implementing partners. UNMIS demining platoons' paltry output could not be justified with claims of difficult operating conditions or particularly challenging tasks, and their costs were orders of magnitude greater than commercial contractors and NGOs.)

Commercial contractors and NGOs conducted the majority of clearance in Sudan, which along with the military demining platoons cleared more than 5.8 square kilometers of mined/ERW-contaminated areas, destroying more than 7,500 antipersonnel and antitank mines and more than 7,000 ERW in 2010 using manual deminers, mechanical clearance tools, and mine detection dogs. UNMAO points to 2010 as bearing the successes of the land release policy, with cost per square meter at its lowest level, number of explosives cleared at an all-time high, and the number of hazardous areas deemed safe at an all time high as well. In light of these successes, the average ratio of

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the UN compound for 48 hours during Northern and Southern armed conflict in Abyei. "Scores" of civilians were killed, and thousands fled their homes. This follows a similar failing in 2008 when peacekeepers refused to allow civilians caught in Northern and Southern crossfire to seek refuge in their compound. See "EXCLUSIVE-UN Probes Peacekeepers' Absence Amid Sudan Clashes," *Reuters*, June 4, 2011, http://www.reuters.com/article/2011/06/04/sudan-abyei-un-idAFN0415698520110604; David Smith, "UN Admits Peacekeepers Failed in Sudan Clashes," *The Guardian*, June 6, 2011, http://www.guardian.co.uk/world/2011/jun/06/un-admits-sudan-peacekeepers-failure.

explosive to amount of land cleared in 2010 was one explosive to 400 square meters (or 4305 square feet, approximately 1/10 of an acre). This 1:400 ratio illustrates the powerful perception of hazard and risk a mine/ERW generates in that large tracts of land and roads remain unused by a relatively small number of explosives. In effect, there are three types of "mines": those that are perceived to be in the environment but are not in fact present, those that are unpredictably positioned in that the explosive does not conform to standardized military practices or have inadvertently moved since placement, and those that largely conform to a clearance-oriented actor's expectations of mines used in a deliberate and predictable manner by military forces. While in some mine/ERW-contaminated areas the explosives are patterned and systematic, other areas have random and haphazard contamination. Sometimes, patterned minefields can become slightly askew as torrential rains and strong sandstorms can move mines from their original positions or bury mines and other ERW under significant amounts of earth. According to modern Sudan historian Robert Collins, "there was little training of (Northern) government troops in guerilla warfare, and even less incentive to engage in it. The [Sudan Armed Forces of the North] was essentially a garrison army content to remain behind its fortifications in the main

towns *protected by extensive minefields*"[10] (emphasis added).

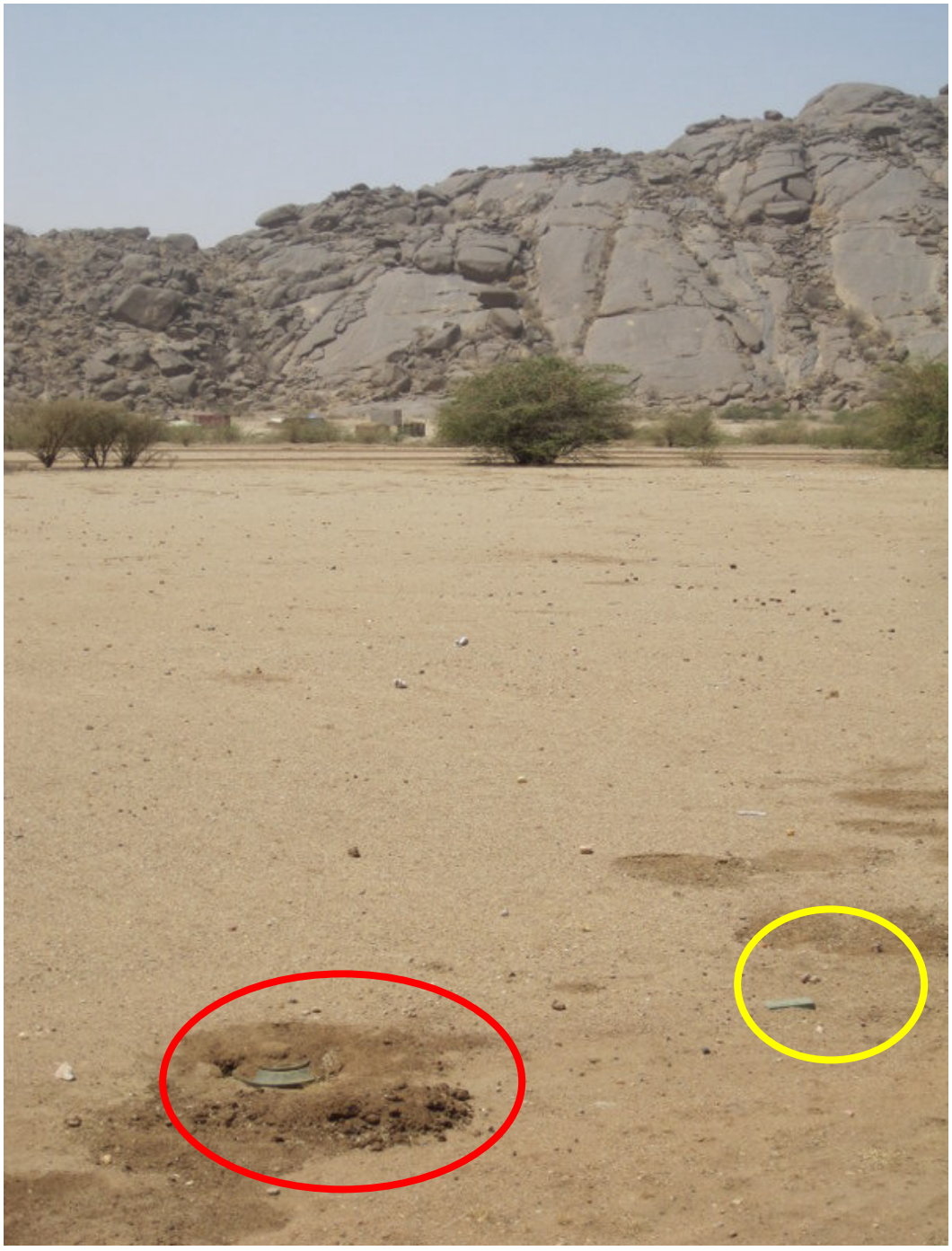

Figure 22: The yellow circle on the right indicates an Iranian copy of an Israeli No. 4 antipersonnel mine which "protects" the Russian TM-57 antitank mine, circled in

[10] Collins, *A History of Modern Sudan*, 253.

red. These mines were laid in a pattern by the North's Sudan Armed Forces to protect a military camp set at the base of the small rocky mountains. While these systematically laid mines were easier to find, the sheer number of mines (several hundred antitank with twice as many antipersonnel, as two antipersonnel mines "guarded" each antitank mine), made this particular clearance task span several months. A single antitank mine is capable of destroying a vehicle. Photo taken in March 2011.

Figure 23: A mechanical asset using a flail attachment. Photo from UNMAO. Taken in November 2010.

UN-sanctioned clearance operators in Sudan utilize three standard technologies: manual human deminers using metal detectors, mine detection dogs, and armored machines that my actors simply referred

to as “mechanical assets.” In South Sudan, one international NGO deployed an all-women team of deminers as a living example of equal employment in a traditional patriarchal society, but men do all of the clearance work in the North, where gender equality is far more distant.

Manual human deminers wear personal protective equipment consisting of a Plexiglas visor and a Kevlar apron while sweeping a metal detector across a 1-meter wide lane. Every signal from the detector is investigated and treated as a potential explosive. While the majority of signals are false, when the deminer encounters an actual mine/ERW, he stops his work and calls a supervisor. All other deminers stop their work, and the supervisor decides whether to destroy the mine/ERW *in situ* (i.e., in place without any attempt at removal) or if the mine/ERW can be rendered safe enough for removal to a central collection location to be destroyed with any other items *en masse*.

Mine detection dogs are trained dogs paired with a manual human deminer who serves as the dog’s handler. Dogs are attached to a long leash and walk back and forth in a “box” of ground demarcated with caution tape. When the dog detects an explosive’s scent, it indicates to its handler who then marks the approximate area from the box’s perimeter. After the dog has completed sniffing through the box, the handler investigates each signal from the dog with a metal

detector. Any mines/ERW discovered are handled as described above.

Mechanical assets are armored machines that can till or plough through the ground to destroy and/or detonate mines. Different front attachments work with different types of terrain: some resemble tractors with fixed blades while others consist of several lengths of metal chains with “hammers” swung at the end. Additionally, different mechanical assets have varying degrees of durability: some are equipped for both antipersonnel and antitank landmines while other smaller machines can only handle the former. These machines move across the land until they encounter an explosive. Depending on how many are estimated in the area, the machine may continue or if numerous mines/ERW are present, manual deminers may be used.

Figure 24: A mine detection dog on a long leash held by a handler who has clearance and animal training. Photo from UNMAO. Taken in October 2010.

In addition to IMAS, the Sudanese government's National Technical Standards and Guidelines (NTSGs) and each organization's Standard Operating Procedures (SOPs) govern the requirements, practices, and guidelines at a given site for clearance (and all other mine action activities). This three-level structure is analogous to legislation based on federal (IMAS), state (NTSG), and local (SOP) laws and points to how international authority in mine action looms over such operations in Sudan. The most direct form of such authority comes from UNMAO quality assurance officers conducting a "desk review" of each organization's SOP. The SOPs are reviewed both to ensure compliance with IMAS and NTSG and to reflect the conditions

facing the organization. The many organizations in working across Sudan may have varied casualty evacuation options, for example. In addition, certain practices are universally adopted across Sudan without being codified in IMAS, NTSGs, or SOPs. For example, a typical day for a clearance team begins before dawn, bringing all necessary equipment and moving from a campsite where the team stays to the worksite. The high temperatures call for starting work by sunrise to allow an adequate number of working hours before the heat becomes a legitimate safety hazard.

The team's manager and leader give an overview briefing to the deminers outlining the day's plan, and each deminer takes a turn to ensure his metal detector is calibrated properly. A key feature of a clearance team is a clear chain of command structure with prescribed communication channels and operating procedures, not unlike a military hierarchy. Managers were almost exclusively white expatriates, generally from Europe, Zimbabwe, or South Africa, while their subordinates, starting with the team leader, deputies, and then the deminers, were Sudanese men of varying ages. Some of the Sudanese deminers had military experience (not necessarily with engineering or explosive ordnance disposal), while others were civilians who sought the relatively well-paying employment that working on a clearance team offered them.

Once in the work area, deminers work in linear lanes spaced several meters apart, both to reduce the risk of multiple explosions and casualties as well as interference from neighboring metal detectors. The physical work of searching for mines/ERW requires a deminer to sweep his metal detector from one side of his one meter wide lane to the other twice before he can progress incrementally with a predefined amount of overlap between forward moving sweeps. UNMAO officials tend to use as a rule of thumb an efficiency rate of 40 square meters per day per deminer in light of – or arguably, despite – the wide variety of conditions that deminers face (40 square meters is 430 square feet, approximately the size of a studio apartment). Different types of terrain (e.g. flat desert, high rocky hills, lush equatorial forests), high concentration of metal scraps, various densities of minefields, extreme seasonal weather patterns, and a whole host of other challenges associated with operating far from urban centers and built infrastructure all work against clearance teams. While individual deminers would not necessarily be punished for lower productivity, UNMAO quality assurance officers and managers could investigate with a team manager for explanations in variable productivity.

Figure 25: A deminer in the foreground has begun clearing a 1 meter wide lane while a team leader instructs another deminer as to where he should begin clearing his 1 meter wide lane. Photo from January 2011.

Figure 26: Pieces of metal a deminer stores in a standard issue bucket used to hold all non-explosive scrap encountered during clearance. Photo from January 2011.

When a deminer's metal detector emits a signal, the deminer must proceed as if the cause of the signal is in fact a mine. More often than not, the source of the signal is not a mine but innocuous scrap metal that remained from earlier human activity (e.g. empty food containers, broken equipment, etc.). However, until the deminer can visually verify what causes the detector's signal, he must proceed as if he will encounter a mine/ERW. If a mine is found, the deminer will signal to a supervising member of the team. Depending on the type of mine, its position in the ground, and its location relative to the larger clearance area, mines can be defused and then manually moved to a

central location for later destruction with other mines. If a mine cannot be defused safely and removed, the whole team will stop its work until the located mine is destroyed *in situ* with other explosives.[1] In the example illustrated in Figure 22, manual deminers removed the antitank mines for a later combined detonation with other antitank mines and left the antipersonnel mines in the ground to be detonated and/or destroyed by the mechanical asset. After the mechanical asset (in this case, a Soviet-era tank with its turret removed and retrofitted with a front attachment equipped to fit either flails or a tiller) has neutralized the antipersonnel mines, either manual deminers or mine detection dogs will double-check the land.

With both clearing land for the first time or double-checking a mechanical asset, a deminer's tools include a metal detector as well as repurposed gardening tools: shears, clippers, and "probes" which are metal picks to poke through the ground horizontally. These tools are used to clear vegetation and tripwires that if pulled could detonate an explosive. Given the generally low number of mines relative to the amount of area cleared, some mine action actors describe manual clearance as gardening or archeology. Without encountering

[1] One type of mine found in Sudan is a "No. 4" originally manufactured in Israel but copied by other countries including Iran. No. 4 mines were involved in numerous deminer accidents during clearance, which led one UN quality assurance officer to issue a written recommendation that No. 4 mines always be destroyed in situ rather than lifted from the ground. See Andy Smith, "Mines Israel No.4," *DDAS: Database of Accident Records*, accessed October 7, 2012, http://www.ddasonline.com/minesIsraelNo4.htm.

explosives, manual deminers carefully comb through the earth as one imagines an archeologist uncovering ruins or a skeleton. Cutting vegetation and searching for tripwires that could detonate a mine could be mistakenly interpreted as an attentive gardener, if it was not for the Kevlar apron and Plexiglas visor that offer protection from explosions. Many deminers state – both in public settings such as interviews and websites as well as in private conversation – that they are proud of the work they do to help humanitarian efforts; other deminers do not deny such a feeling but they also point out – in public and in private – the danger, physical discomfort, heat, boredom from meticulous tedium, and the dangers of complacency.

This manual work is the most time and resource consuming, but it is generally perceived in the mine action community as the most effective and trustworthy technology in mine action. Such effectiveness and trustworthiness come with costs, primarily in terms of time but potentially financial as well, and these costs have led some mine action organizations to highlight other available means in the mine clearance "toolkit."

Mine detection dogs (MDDs), it should be noted, are not clearance technologies *per se* in that the dog can only indicate whether it perceives the scent of an explosive. A deminer must still do the work of finding the precise location of the mine and then neutralize the

explosive. In Sudan, MDDs are used for area reduction, i.e., sniffing the perimeter of a large Suspected Hazardous Area/Confirmed Hazardous Area/Dangerous Area until an explosive is located to decrease the area a deminer has to clear. MDDs are also used to verify that no explosives remain after a mechanical asset has processed an area. The National Technical Standards and Guidelines in Sudan stipulate that if an MDD is the first technology used to investigate an area for mine/ERW contamination, the area covered by the MDD must be verified by another MDD.

Mechanical assets are used as in conjunction with manual deminers and MDDs as they can detonate and destroy antipersonnel and antitank mines (depending on the specifications of the asset). Using a mechanical asset to determine that an area does not have mines/ERW is the quickest method of releasing the land, and in some cases where mines/ERW are patterned, a mechanical asset can quickly find where the mine lines start so that manual deminers spend less time processing uncontaminated areas. At Haldet Sharq in Kassala state, the JIDU clearance team discovered the pattern of mines in the area and manually removed the antitank mines while leaving the antipersonnel mines. Patterned minefields are usually near a military installation or camp as the mines serve a defensive rather than offensive purpose; in my experience in Sudan, the mines/ERW

that affected local communities away from military bases were rarely predictably organized in a way that facilitated "easier" clearance. All areas processed by a mechanical asset must be verified either with manual deminers or an MDD (MDDs must wait several days before conducting verification as the mechanical asset may have "kicked up" the scent of explosives that may confuse the MDD).[2]

Given Sudan's extreme heat, both MDDs and mechanical assets cannot work as many hours as a deminer: MDDs are long-haired breeds that cannot withstand high temperatures, and mechanical assets can readily overheat and break down. Other conditions, such as wind speed, which may interfere with a MDD's sense of smell, or hilly and rocky terrain that precludes the use of a mechanical asset, can impede the rate of clearance. Manual deminers, on the other hand, are generally expected and have proven able to conduct clearance for the NTSG-required six hours a day, with a 10-minute break every hour.

Collectively, these three technologies constitute a critical part of the clearance regime of perceptibility: a demonstrable materiality manifested only through visual evidence, not local suspicion. Indeed, clearance sites – much like laboratories and other settings for STS analyses – are "disciplined spaces, where experimental, discursive, and

[2] United Nations Mine Action Office, *National Technical Standards and Guidelines Sudan, Edition 10, Version 1* (Khartoum: United Nations Mine Action Office, September 1, 2010), 347, http://www.sudan-map.org/index.php?option=com_content&view=category&layout=blog&id=41&Itemid=39.

social practices were collectively controlled by competent members."[3] Across the sites are markers, an attempt at order and systemization, established and enforced by social groups in mine action. These attempts, however, span landscapes that have a lower concentration of mines/ERW than initial estimates suggest.

Standardizing Clearance and Developing Land Release

"Land release isn't 100% perfect, but it gets hazards reduced and people gain confidence. Yes, mistakes can happen, but 50 million square meters released with one mistake..."[4]

This quote is from Mohammed Eltayeb, Sudan's National Mine Action Center's regional operations coordinator. He is responsible for overseeing day-to-day operations of the three sub-offices, and we were discussing the subject of "land release" in mine action. In the audio recording of our conversation, Eltayeb's voice trails off at this point, and his silence speaks to the power of "mistakes" in mine action. For a government or UN official, a mine/ERW that remains in the ground can be a "mistake." But for the man, woman, or child who steps on that mine/ERW, that mistake is a lifetime of hardship not only for him- or herself, but also the wider social network of family members, relatives, and neighbors.

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[3] Shapin and Schaffer, *Leviathan and the Air-Pump*, 39.

[4] Mohammed Eltayeb, "Interview, Khartoum, Sudan," May 5, 2011.

Such "mistakes" in mine action are particularly poignant for people in the field who have experienced the codification of "land release" into the International Mine Action Standards in 2009 and its subsequent adoption across all mine/ERW clearance work. The definition of land release is at first glance broad and generic. It is defined as "the process of applying all reasonable effort to identify, or better define, Confirmed Hazardous Areas and remove all suspicion of mines/ERW through non technical survey, technical survey and/or clearance," with "all reasonable effort" defined by national authorities.[5]

While the codification of land release is a recent global development across all of mine action, UNMAO's Deputy Programme Manager Leonie Barnes made the claim in a 2010 presentation on the subject that "land release is a term used for something that was done instinctively in the past – in some cases better than others and in some cases not at all well and in some cases not at all."[6] Of particular concern to the mine action community, for whom donor funding and foreign aid are its limiting factors, is that

in the past, the practice of releasing land was based on a

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[5] United Nations Mine Action Service, *IMAS 4.10 Glossary of Mine Action Terms, Definitions and Abbreviations, Second Edition*, para. 3.155.

[6] Leonie Barnes, "Mine Action and Technology - Mechanical Clearance and Land Release" (presented at the Mine Action Technology Workshop 2010, Geneva, Switzerland, September 20, 2010), http://www.gichd.org/fileadmin/pdf/technology/Technology-Workshop-2010/K-7Sept2010-LR-Sudan-TechWS.pdf; http://www.gichd.org/operations/technology/mine-action-technology-workshops/third-mine-action-technology-workshop-6-8-september-2010/overview/.

> subconscious and subjective decision-making process by demining organizations in the field. There is, in principle, nothing wrong with informal decision-making, but when it causes excessive clearance, and subsequently a waste of resources, there is a need to reflect on whether current practices are efficient and if they should be challenged.[7]

In other words, when an area with a large perimeter was entered into a database, that entry was subsequently taken at face value by data entry staff and experienced supervisors, who are required to ensure that all data are verified with the findings from the field. In light of Sudan's large land area, one senior UNMAO official pointed out to me "you cannot poke and prod your way from Khartoum to Juba" (the capitals of Sudan and South Sudan, respectively, are 750 miles apart, approximately the same distance as Ithaca, New York to central South Carolina). Thus, determining and demarcating *which* areas need to be cleared is just as important as the actual clearance itself. These decisions are made both in the field and behind a desk in front of computer screens.

[7] Bach, "Clearing Areas Right; Clearing the Right Areas."

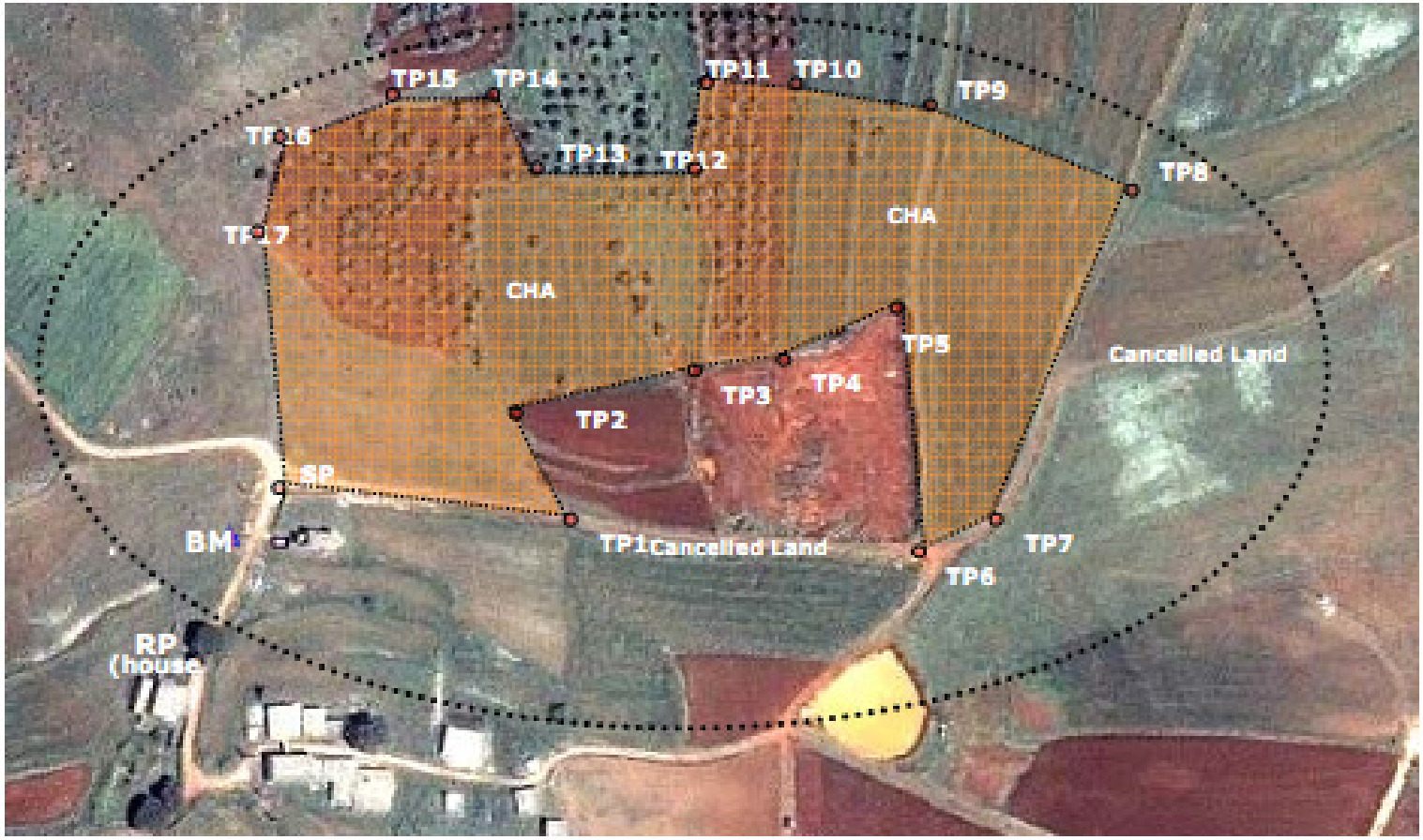

Figure 27: An example of mapping the smallest area of land deemed to require clearance. The outer dotted circle was the perimeter of an area initially thought to be contaminated. The inner polygon – marked with turning points labeled TP1, TP2, etc. – marks the area where mines/ERW were found. The remaining land was classified as "canceled" with no evidence of mines/ERW, and no mines/ERW have subsequently been found. Diagram from GICHD. Published in April 2011.[1]

[1] Geneva International Centre for Humanitarian Demining, *A Guide to Land Release: Technical Methods*, 15.

The establishment of land release into the lexicon and operations of mine action emerged in part from the evolving understanding of what constitutes "clearance." While 1997 was a watershed year for mine action with the Mine Ban Treaty coming into being and the UN General Assembly establishing immediately thereafter the UN Mine Action Service as a global focal point for the field, it wastwo years for a first draft of the International Mine Action Standards to be published. Moreover, it was another two years after that before these standards were ratified and accepted by the Mine Action Service.

One reason for this lengthy process was the IMAS Review Board – the officially designated body responsible for drafting and overseeing the International Mine Action Standards – struggled with how to define "clearance." One of the longest serving members of the IMAS Review Board recalls, "central to the standards was an agreed definition of what "Clearance" actually meant. It did not refer to mines, it referred to areas. It did not mean removing most mines from an area. It meant clearance of ALL explosive hazards to an agreed depth over that area."[1] The broader implications of these initial standards was the premise of "mine-free" nations, the desired end-state for mine action within the

[1] Andy Smith, "The Death of the International Standards," *Landmines and Humanitarian Mine Action*, November 2011, http://www.nolandmines.com/Death_of_IMAS.htm.

activist-oriented regime.

In addition, the International Mine Action Standards contain several distinctions regarding the various end states of Suspected Hazardous Areas, Confirmed Hazardous Areas, and Dangerous Areas (all of which have specific, codified definitions). While the glossary for all of the professional jargon spans 44 pages, some key terms are worth noting. The most recent definition of clearance took effect in 2009 and states "in the context of mine action, the term refers to tasks or actions to ensure the removal and/or the destruction of all mine and ERW hazards from a specified area to the specified depth."[2] Consequently, cleared land is "an area that has been physically and systematically processed by a demining organisation to ensure the removal and/or destruction of all mine and ERW hazards to a specified

[2] United Nations Mine Action Service, *IMAS 4.10 Glossary of Mine Action Terms, Definitions and Abbreviations, Second Edition*, para. 3.35. Manual demining is the only method under IMAS and most mine affected countries' national authorities that fully satisfies the requirements of clearance. See also Benjamin Wang and Rae McGrath, "a Plethora of Photos," *Facebook*, July 16, 2011, https://www.facebook.com/photo.php?fbid=10100137545868804&set=a.895221197414.2528675.3301289&type=3&theater. Andy Smith, a former member of the IMAS Review Board who is responsible for two prominent mine action websites, www.NoLandmines.com and www.DDASOnline.com (which stands for Database of Demining Accidents) has published sharp critiques of the current IMAS and codification process. While DDASOnline contains as many demining accident records as he can procure, NoLandmines is a personal forum for Smith to describe many shortcomings of mine action, particularly the UN's role in Sudan (and later Libya). Among his many criticisms of the top-down control exerted by UNMAS and GICHD (which he parodies as "GiHAD"), Smith points to IMAS revisions that allow for mechanical demining to constitute clearance, which coincided with UNMAO's increasing reliance on mechanical clearance and the few international organizations capable of operating such machines. Smith's contention is that UNMAS and GICHD are colluding to allow clearance organizations to profit from demining contracts. While I did not learn of Smith's critiques until after I returned from Sudan, his views are worth noting as one perspective of a former "insider."

depth."[3] Thus, even a decade after the first standards and aspirations for "mine-free" nations, the International Mine Action Standards – as a baseline for all large-scale clearance efforts – are still focused on the "mine-free" ideal advocated within the activist-oriented regime. The implications of this ideal for land release is a continual pressure for all areas to be cleared, whether mines are there or not.

What is central to these dimensions of clearance is the act of removal and/or destruction of a mine/ERW that was materially present. This may seem obvious, but it is a clear contrast to a "cancelled" area. "Cancelled" is an official IMAS designation for "an area of land previously recorded as a hazardous area which subsequently is considered, as a result of non-technical and technical surveys, not to represent a risk from mines and ERW."[4] While a cleared area and a cancelled area may both be the same end state of an area previously perceived as containing a hazard, the process by which such end states are reached is significant. A cancelled area is the result of expert judgment that a previous designation of hazard lacks any credible evidence. The IMAS definition for cancelled area contains the note "this change in status [from hazardous to cancelled] will be the result of more accurate and reliable information, for

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[3] United Nations Mine Action Service, *IMAS 4.10 Glossary of Mine Action Terms, Definitions and Abbreviations, Second Edition*, para. 3.36.

[4] Ibid., para. 3.29.

example from non-technical survey, and will normally only be authorised by the [National Mine Action Authority], in accordance with national land release criteria. The documentation of all cancelled areas shall be retained together with a detailed explanation of the reasons for the change in status."

A critical part of the International Mine Action Standards definition of land release is the clause "all reasonable effort," and one key element of "all reasonable effort" is that such efforts are "evidence-based." Of course, "evidence-based" begs for unpacking, and "objective" evidence comes from subjective clearance operators and the technologies they employ to create such objectivity. It is also worth noting that according to IMAS, a "community's fear of mines/ERW or residual contamination does not constitute evidence."[5] Instead, evidence comes from those with expertise in mine action organizations that follow IMAS and other top-down standards and requirements.

Indeed, *The Journal of ERW and Mine Action* dedicated its August 2009 to land release in what was one of the first public discussions of the new addition to the International Mine Action

[5] Håvard Bach, "Land Release: Purpose, Principles and Practice," n.d., http://www.mineaction.org/downloads/1/Land%20Release-%20Purpose%2C%20Principles%20and%20Practice%20Havard%20Bach.ppt. "Roller" and "large loop" are two easily deployable mine/ERW detection techniques. A roller resembles a steamroller that moves across the ground. A large loop is a metal detector in the shape of a rectangle made of thin pipes held by straps between by two deminers. The deminers walk at a measured pace and are able to scan the ground between them.

Standards. One GICHD official made the point in an article that

> if the local population still suspects mines after land has been released by survey, this skepticism should not prevent release; rather it compels a need for more confidence-building, preferably through better explanation of why the land can confidently be released or, at worst, by applying some degree of physical confidence-building (roller, large loop, etc.).[6]

Indeed, the phenomenon of landscapes contaminated after a conflict "come(s) into being through multiple histories that did not all agree on the terms by which [mine/ERW placement] could be shown to have happened or not."[7] It is the physical material in the environment that socio-technical responses address, and these responses are successful if they can demonstrate either the absence of mines/ERW or "proof" of their removal.

Returning to the question of what constitutes evidence, mine action organizations working within the clearance-oriented regime point to physical indicators such as abandoned military outposts or animal carcasses as well as local accounts of fighting and the presence of either Sudanese soldiers or South Sudanese rebels. By focusing on the "evidence," the person or organization making such a determination has effectively – although perhaps unintentionally – removed himself and his judgments from view. Moreover, the person or organization tacitly imbues "evidence" with a particular context that

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[6] Bach, "Clearing Areas Right; Clearing the Right Areas."

[7] Murphy, *Sick Building Syndrome and the Problem of Uncertainty*, 8.

also remains out of view when such evidence justifies a particular course of action. I will return to this issue, but it is worth noting here that the international community's requirement for "evidence" as a basis for interventions functions as a justification for UNMAO accepting either a clearance organization's decision to clear or not to clear an area. However, such evidence is not a certification that the area is free of all mines/ERW. In fact, clearance organizations have deliberately adopted a regime of perceptibility that is incommensurable with certifying an area as free from mines/ERW. The clearance regime's concerns about efficient use of limited financial resources and its acknowledgement of natural and material contingency – namely mines/ERW that move and shift after rain and sand storms – preclude providing certification that all mines/ERW are gone.

This inability to certify complete mine/ERW removal serves to demonstrate what is possible within the clearance regime given a particular constellation of interests, priorities, and available technologies. The people who act on these interests and priorities with the technologies available to them also lay claim to technical expertise; as the origins of mine/ERW clearance suggest, such expertise draws from military engineering experience. While there is a distinction between clearance of mines/ERW for military operations on one hand and humanitarian aid on the other, such a distinction is one of degree,

not kind. Humanitarian clearance is military clearance to a more thorough degree and a lower acceptable risk for civilian populations instead of soldiers.

UNMAO and clearance organizations recognize the constraints of their technology and of their regime of perceptibility by virtue of having limited financial resources. While UNMAO and others do not use language and discourse along the lines of "the limits of available technologies and the agency of nature," these two dimensions very directly shape UNMAO's work. Furthermore, the use of evidence to justify "all reasonable effort" is noteworthy, especially as it is a lesser, weaker requirement from guaranteed clearance that was characteristic of much of the early rhetoric of mine action. "All reasonable effort" succeeds the arbitrary and symbolic figure of 99.6% clearance which had a short life in official discourse; just as clearance organizations deemed 100% clearance impossible because of environmental and material factors beyond their control, 99.6% was impossible because there was no way to calculate what that figure meant in each clearance task.

The phraseology of the "all reasonable effort" requirement in land release still readily allows for on-the-ground decisions by clearance team managers in consultation with UNMAO officials in the field (and to a limited extent with Sudanese authorities' involvement).

In one respect, moving away from an absolute standard of clearance in which *every* mine/ERW is found and destroyed reflects a change in how clearance professionals constructed their regime of perceptibility: several years of experience in various countries revealed the limits of the various clearance technologies in the face of dynamic and variable environmental conditions.

Equally important as an outside expert's judgment is what information local communities offer to the clearance organizations (and indirectly, national mine action authorities). Given the emphasis on efficiency and "clearing mines, not land," clearance organizations will not generally clear land that communities are already using or people say they feel safe using and traveling across. Current land use by locals is stronger evidence for clearance organizations than local communities' suspicions of contamination. Put another way, clearance organizations will readily accept land *usage* as evidence for deciding not to clear an area, but they do not treat local suspicions as "evidence" and instead investigate and interrogate such claims. The rationale is not that usage implies a lack of mines; rather, usage indicates community willingness and/or trust in an area to have an acceptable/tolerable level of risk. However, on the other hand, if communities express suspicions about contamination, these claims are suspect and require readily identifiable evidence to

substantiate/justify any “technical” measures such as technical survey or full clearance. If these field managers decide on a limited intervention as a material demonstration of their belief against the presence of mines/ERW, such actions reinforce their authority and power position. There is thus a significant asymmetry in clearance organizations’ perceptions of local views: these organizations willingly accept a community’s land usage as “evidence” that justifies land release while simultaneously dismissing the same community’s suspicions of mine/ERW presence if those suspicions do not conform to “expert” expectations. Such asymmetry highlights how such organizations prioritize efficiency and efficacy over lengthy, exhaustive clearance.[8]

Indeed, Sudan’s National Mine Action Center’s regional operations coordinator Mohammed Eltayeb spoke to this very point in the conversation I cited at the beginning of this section. When his voice picked up again, he continued: “[land release] doesn't mean you are free of mines. You can miss mines during technical survey; even during 100% clearance you can miss mines because of limited depth [requirements].” For Eltayeb, he managed the inherent uncertainty in mine/ERW clearance by telling me “we can't be sure of 100%

[8] This is not to say that clearance is always rapid and minimal, but the emphasis of clearance is to clear no more than necessary to satisfy the standards and requirements in place.

clearance, but we are doing our best to release land in the proper way. *Alhamdulillah* (Praise to God), we have a low (accident/casualty) rate."[9]

When accidents happen

UNMAO officials and other mine action actors whose experience is based on working in a variety of mine-affected countries maintain that the extent of Sudan's landmine contamination problem is not particularly severe relative to other countries' and considering the scope of Sudan's civil war and the size of the country. By the end of 2010 (the last available figures available), UNMAO and national authorities recorded at least 1,651 mine/ERW casualties (approximately 30% of which were fatalities). In 2010, UNMAO and national authorities recorded 67 individual casualties (22% fatal) up from 40 casualties in 2009. In more than half of the accidents (37), the cause was unknown. Only four casualties were directly attributed to antipersonnel mines. In countries like Sudan, UNMAO and *Landmine Monitor* believe that such figures are too low; the lack of infrastructure and marginalization of much of Sudan means it is almost certain that some accidents go unreported.

Mine/ERW accidents are the results of several situations:

[9] Eltayeb, "Interview, Khartoum, Sudan."

- A person or animal encountering a mine/ERW in an area not designated or known to be suspected or hazardous;
- A person or animal encountering a mine/ERW in an area designated or known to be suspected or hazardous, but not yet cleared or released;
- A person or animal encountering a mine/ERW in an area designated or known to be suspected or hazardous and cleared or released (referred to as a "missed mine");
- A deminer being injured or killed in the process of working at a task site.

While UNMAO and Sudanese authorities will investigate any reported accident, the last two events result in more thorough inquiries involving a greater number of investigators as such events imply negligence or wrongdoing. In this section, I focus on the third situation – missed mines – which is the most troubling to mine action organizations and communities alike. Beyond asking how such accidents happen, I utilize UNMAO's investigations as an opening into what such accidents say about disciplining an environment and the efforts of centralized and professional bureaucracy in contaminated landscapes. What is taken for granted and what is the subject of inquiry reveals UNMAO's regime of perceptibility and how one form of order emerges.

Accident #1

In August 2010, after UNMAO had been in Sudan for more than five years (but three months before my arrival in the country), a local farmer in the town of Al Lafa in Kassala state in the eastern region of

Sudan detonated an antitank mine while plowing his field with a tractor. Remarkably, the farmer only had minor injuries. The antitank mine was most likely a Belgian manufactured PRB M3 Anti Tank mine.[10]

When UNMAO learned of the accident, the office realized that the area of the accident had been previously cleared.[11] An initial investigation team examined the site of the accident and visibly identified two additional PRB M3 Anti Tank mines. When another clearance team cleared an area with a radius of 20 meters from the accident site, they found a third PRB M3 Anti Tank mine and a PRB M35 Anti Personnel mine. UNMAO then convened a higher-level board of investigation inquiry upon these findings because they called entirely into question the earlier "clearance" and "release."

However, over the course of the board of investigation, the

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[10] "PRB M3 and PRB M3A1 (Belgium)," *Jane's Mines and Mine Clearance*, 2011, http://articles.janes.com/articles/Janes-Mines-and-Mine-Clearance/PRB-M3-and-PRB-M3A1-Belgium.html.

[11] This section draws in part from a publicly distributed "Lessons Learned" document issued by UNMAO to all of its implementing partners and the mine action community. This document is an anonymized summary of UNMAO's formal board of inquiry investigation; the findings of such investigations are as a matter of practice internal and confidential. After the UN's peacekeeping mission in Sudan concluded in June 2011, UNMAO handed over all of its records to the Sudanese national authorities in the National Mine Action Center (NMAC). Upon my request, NMAC provided me a copy with their Information Management System for Mine Action database, which ought to contain every mine action report produced. However, as discussed in chapter 1 of this dissertation, "data quality management" has not been uniformly and consistently employed. Thus some reports are mislabeled and uniformity and consistency is lacking. While it may be possible to fill in the gaps and provide a more identifying account of the Lessons Learned documents, such de-anonymization is not necessary for my purposes here.

investigators found that the clearance organization's documentation of its work was woefully inadequate. As Steve Fantham, UNMAO's deputy chief of operations states, "this made it very difficult for the [Board of Inquiry] team to determine the extent of the cleared area, mine lines worked on, technical survey completed to 'fade out' the task, etc."[12]

Normally, when a clearance organization completes its task, it designates an easily identifiable point as a fixed benchmark. Such a benchmark – a blue spray-painted rock with the letters "BM" in white – serves as a reference for turning points that delineate the perimeter of the cleared area. This clearance site, though, lacked a benchmark, and several turning points were more than 100 meters apart with one at 212 meters apart. This is problematic as such large distances between turning points makes it more challenging to "connect the dots" and allows a higher degree of uncertainty in establishing if an area has been cleared or not that could pose dangerous.

Moreover, records that would give an indication of how the clearance organization worked were missing: "there was also no daily work sheets, daily work completed, detector testing, site map, visitors log, etc *Note: the Mine Action office accepted this at the completion*

[12] Steve Fantham, *BOI 2010/03 INVESTIGATION INTO MISSED MINE AT AL LAFA RECOMMENDATIONS* (Khartoum, Sudan: United Nations Mine Action Office, November 23, 2010), 1.

and hand-over of the task"[13] (emphasis in original, indicating not just emphasis but a critical tone). This last sentence is indeed alarming, and Fantham continues by pointing out that "the lack of on site visits and quality assurance (QA) checks contributed to the poor paperwork of the clearance organisation."

In his concluding paragraph, Fantham writes

> We would all admit that we have made errors with documentation in the past. All contractors, NGO's and the UNMAO as the coordinating agency should be aware that this is unacceptable. *It is all very well to pull mines out of the ground, but if the documentation is not there to support it, we are wasting our time* (emphasis added). Make a commitment now to place a greater emphasis on accurate reporting and procedures.

For mine action actors, documentation of measurements and calculations are critical to sustaining their donor-funded work, and such documentation allows mine action to maintain one of the trappings of a modern profession. Moreover, UNMAO's documentation functions as a literary technology as Steven Shapin articulates,[14] allowing any readers to virtually witness the environment and – UNMAO expects – its decision-making process. These two reasons are interrelated, as donors need to justify to their overseers dispersing funds to qualified organizations and efforts. While some mine action actors – notably donors – have often made the point that community

[13] Ibid.

[14] Shapin, "Pump and Circumstance."

confidence and land usage after clearance is what redeems the costs and expenditures of clearance, Fantham's equating of clearance's value with documentation is a markedly different formulation.

Community confidence and subsequent land usage speak to the acknowledged multi-faceted understanding of mines/ERW: that is, beyond the material considerations of the explosives, there is also the social perception of mines/ERW that in itself is capable of doing work. As one function of a landmine (and less intentionally other ERW) is to deny land and prevent an area from being used or traveled, the perception of a landmine is sufficient without the material artifact. Thus, physical clearance – or other physical interventions such as technical surveying – not only clears mines or notes the lack of their presence, but establishes the presence or absence of mines/ERW as a collectively agreed upon "matter of fact."

What Fantham claims, however, is that clearance is for the UN – and to a lesser extent, the Sudanese National Mine Action Center – and local communities are one degree removed, if not ignored. Thus, for an area to be free from the impact of mines/ERW, it is not sufficient that the area be materially/physically cleared; the UN must say it is cleared and have records tracing and documenting the process. Fantham's admonition for documentation is not for all documentation, but qualified experts' documentation. Moreover, Idris

Hamdeen, Sudan's NMAC operations officer in Kassala, recalled, a mine-risk education team had been tasked to the area after the second clearance efforts. Their objective was to inform the community's that "we clear the area to make sure, 100%, there is nothing left." The reification of documentation and record keeping, and the subsequent communication of such efforts, however, produces an equally challenging issue for clearance in mine action that plays out in other accidents and UNMAO's investigations.

Accident #2

Later in 2010, UNMAO would convene another Board of Investigation, this one in South Sudan.[15] The accident that instigated this investigation involved a civilian contractor's large road grader (a construction machine that pushes a long blade to create a level surface) on the Juba – Nimule road, a 119-mile stretch that connects the South Sudanese capital to Uganda, through which most of South Sudan's trade and commerce occurs. The road's strategic location and significance in the most contested part of Sudan during the decades of civil war made it a prime location for repeated mine laying by both sides of the conflict. Thus, the road was one of UNMAO's highest clearance priorities, and the office has tasked multiple organizations to

[15] Steve Fantham, *BOI 2010/02 INVESTIGATION INTO MISSED MINES ON THE JUBA-NIMULE ROAD, SOUTHERN SUDAN* (Khartoum, Sudan: United Nations Mine Action Office, January 5, 2011).

clear the road, initially in 2006 at a width of 8 meters (4 meters on each side of the center of the road, a width which has been termed the "humanitarian corridor" to allow one lane of traffic in each direction), and then several years later to 26 meters to allow increased traffic and a road shoulder (13 meters on each side of the road's center).

The contract for modernizing the Juba-Nimule road by leveling the surface and adding tarmac went to the Louis Berger Group (a major international consulting firm), funded by US$225 million from USAID. The Louis Berger Group sub-contracted a commercial clearance organization, The Development Initiative (TDI), to confirm that all cleared areas were in fact safe for construction to continue. In July 2010, TDI located three antitank mines in areas that were tasked to be cleared, supposedly cleared, and then accepted as cleared. The first mine was found 28.3 meters from the center line, a second 19.5 meters from the center, and a third just 8.2 meters. While the first mine is outside of the 26-meter width, the Board of Investigation reports the last two mines lay within an area that was deemed cleared, although it was not clear where the mines came from.[16]

The BOI determined that the first contractor who had missed the mines (the identity of whom was kept anonymous, although most of

[16] While it is not uncommon for areas to be cleared outside of the 26 meter width if such areas appear well-traveled, the discovery of multiple mines in an area that was not required to be cleared but presented as such could be framed not merely of gross negligence but outright deception.

the mine action community could readily infer which organization was culpable) was grossly negligent and recommended that all of the areas deemed cleared by the management team responsible for these three missed mines be re-cleared by the negligent contractor.[17] This errant contractor was also responsible for another instance of missed mines, also along the Juba – Nimule road, which, unlike this instance resulted in an UNMAO quality assurance officer losing his leg below the knee while conducting a clearance completion survey.[18]

One common theme from these incidents on the Juba – Nimule road and the tractor detonation in Al Lafa, Kassala (two completely distinct areas in terms of their geography on opposite ends of Sudan, topography, people, culture, etc.) is again the issue of documentation. This second BOI noted "there were limited records of work carried out

[17] Matthew Bolton makes the argument that "differing understandings of security, constituent organizations and contractural relationships (produce) differing outcomes" with commercial contractors clearing larger areas for lower financial costs than NGOs but at a reduced quality and safety level, Bolton, *Foreign Aid and Landmine Clearance*, 145. For a more thorough discussion replete with quantitative analyses, see Ibid., chap. 5: Comparing the Performance of Tenders and Grants.

[18] The quality assurance officer was Steve Fantham. Upon his recovery and rehabilitation, he returned to work at UNMAO in Sudan as the acting chief of operations (the previous chief assumed a UN position in New York). UN News Centre, "From the Field: True Grit in the Minefields of South Sudan", February 22, 2011, https://www.un.org/apps/news/story.asp?Cr1=sudan&NewsID=37584&Cr=mine. Based on UNMAO's BOI, Fantham and his wife sued the commercial contractor RONCO Consulting Corporation in the U.S. District Court for the District of Columbia. The case was settled out of court. See "Ronco Consulting Sued for Negligence by United Nations Mine Action Employee," Overseas Civilian Contractors, June 7, 2011, https://civiliancontractors.wordpress.com/2011/06/07/ronco-consulting-sued-for-negligence-by-united-nations-mine-action-employee/; "Ronco Consulting Settles Fantham Lawsuit Before Bothering to Respond," Overseas Civilian Contractors, January 10, 2012, https://civiliancontractors.wordpress.com/2012/01/10/ronco-consulting-settles-fantham-lawsuit-before-bothering-to-respond/

and no available records from the contractor involved or UNMAO relating to accreditation," and "it was unclear whether the complete clearance history of the DA [Dangerous Area] had been handed over to the contractor from UNMAO at the time the Task Dossier (TD) was issued. The contractor's representative's signature on the TD was not identifiable."[19]

If there is no documentation, UNMAO cannot construct its reality of what is cleared and what is not. Yet, at the same time, Fantham noted the BOI's recommendation that

> "there should be a system in place to ensure a suitable follow up procedure for the implementation of BOI recommendations. There should be a record of indicating the follow up steps taken after the completion and dissemination of a BOI report this is detailed in the NTSG's but may not be being implemented (sic)."[20]

Thus, if there is no documentation, a reality can still in fact be constructed, albeit one at odds with what UNMAO already knows from its BOIs. Indeed, in 2011, the Northern region's quality assurance officer Jihad Samhat publicly distributed a summary of every accident and incident from the 2010 calendar year. Moreover, the report details how the issue of residual liability for any potential future accidents in previously cleared areas had not been addressed more than five years after UNMAO began operations.

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[19] Fantham, *BOI 2010/02 INVESTIGATION INTO MISSED MINES ON THE JUBA-NIMULE ROAD, SOUTHERN SUDAN*, 1.

[20] Ibid., 2.

Accident #3

On March 28, 2011, a pickup truck with six Sudanese men drove over an antitank mine approximately one hour away from the village of Rasai in Kassala state. One passenger died immediately, and another on the way to the only hospital in the area located in the main city of Kassala several hours away (Kassala is the also the name of the only major city in Kassala state). Three other passengers were critically wounded and required hospitalization, one requiring amputation of his right leg. The sixth passenger was treated and discharged the same day.

The UNMAO sub-office in Kassala learned of the accident when the victims/survivors arrived at the hospital on the evening of March 28 (a Monday) and began preliminary fact-finding and an investigation. I played a small but not insignificant role in this particular investigation as a participant observer. I was directly involved in brief interviews with two of the survivors on Tuesday, March 29 and was one of several people taking photographs during the field investigation at the accident site. On Wednesday, March 30, I was a part of a team of UNMAO and NMAC officials who departed Kassala in two vehicles to locate the accident site and continue our investigation.

The next day, the team – now accompanied by two deminers,

their supervisor, and an ambulance all temporarily seconded from a nearby clearance team – located the destroyed pickup truck with the assistance of a local herder who was gathering water from a nearby well. The herder had heard the explosion from the accident and led the team to the general area of the accident where the burned out vehicle was readily spotted.

Figure 28: A deminer is supervised by a team leader as he used a metal detector to find a clear path to the destroyed vehicle. Photo from March 2011.

Figure 29: The destroyed truck. Note the blue gas containers on the right which exacerbated the explosion after the truck hit the antitank mine. Photo from March 2011.

The team began taking numerous photographs and readings (e.g., GPS coordinates, explosion crater size, distance between the crater and the pickup truck, etc.). What was notable was the homogeneity of the landscape; aside from the sun, stars, and moon, there were no physical signs to indicate direction or location. The absence of hills, waterways, large rocks, and trees in the figures reveals the vastness of the desert. Moreover, there was no built infrastructure anywhere near the vicinity of the accident. The lack of any physical evidence of mines/ERW in the area and negative results from two deminers doing a "fade-out" search (searching a radius around the explosion site) led the team to conclude informally that the antitank mine was a

"*hamseen*," which is Arabic for the number fifty. During the civil war, the Southern Sudan People's Liberation Army would pay individuals 50 Sudanese pounds to plant one mine randomly against the Northern Sudanese Armed Forces. The mine that caused the accident remained in the road for an untold number of years after the conflict.

Figure 30: The explosion crater. Note the many sets of tire tracks around the crater and the lack of other craters in the area. Photo from March 2011.

Gathering all available information took one hour. In the course of the investigation, the team learned from local herders that the site of accident was on an older “road,” which is basically a gravel path nearly indistinguishable from the “road” the team drove 100 meters away. The latter road, according to the herders, was newer road. Both roads led to a main paved highway that connected Kassala to Port Sudan, the country’s only port on the Red Sea. Upon returning to the sub-office in Kassala later that day, the UNMAO operations officer wrote a report for the main Khartoum office. In his report, the operations officer described the seemingly imperceptible difference between the old road where the accident occurred and the newer road which appeared safe upon driving on it.

Figure 31: The view from the accident scene to the convoy vehicles. The UNMAO official reported the convoy vehicles were what one local herder described as "the new road." Photo from March 2011.

The report's final section lists three recommendation:

1. UN organizations, NGOs and local residents shall be informed of the condition of this road and advised to identify and use alternative routes while traveling by vehicles. They should also take particular caution, look out for and report any signs of mines/UXO in the area.
2. The road should be marked as (a) Dangerous Area, clearly marked from the village and be closed for all vehicle movements until it is verified/cleared.
3. All adjoining road networks in the area should be earmarked for verification at the earliest opportunity to provide a lasting solution to the identified threat to humanitarian operations.[1]

[1] United Nations Mine Action Office, Kassala Sub-Office, *MINE ACCIDENT REPORT RASAI - EASTERN STATES - 28TH MARCH 2011* (Kassala, Sudan: United Nations Mine Action Office, March 31, 2011), 3.

According to IMSMA records as of November 2011, there are no Dangerous Areas listed near Rasai.

It is plausible that the recommendations have not been implemented because of human oversight. However, in light of the larger dynamics that I discussed above that factor into the circumstances of this particular accident, UNMAO's recommendations must be considered within a more challenging context. Given the regular usage of the road for several years and the lack of any visible evidence, the Rasai accident was unforeseen. As the second recommendation signals, the accident recast this area of the environment as hazardous. At the same time, Michelle Murphy points out the process by which "objects were rendered perceptible was in the same gesture intrinsically linked to a delineation of what was imperceptible."[2] The accident made the travelers in the pickup truck, the members of their community that were waiting for them at the hospital where they were treated, herders in the area, and UNMAO all aware of the risk of mines/ERW in an area that no one previously considered hazardous. Yet, no one was in a position to define the risk in such a way that the risk could be addressed and managed. Designating a whole landscape as a Dangerous Area does not help drivers or herders who need to travel, nor does it help UNMAO who

[2] Murphy, *Sick Building Syndrome and the Problem of Uncertainty*, 9.

does not have the financial means to clear all the land to the horizon. To designate a whole swath of visually identical land a Dangerous Area creates a mind-numbing holism; seeing a whole area as a hazard necessarily requires not seeing the distinctions between different constituent parts of that larger area. Labeling a whole area risky does not change behavior or create an alternative. As such, this accident has thus become folded into UNMAO's ready narrative about the threat of mines/ERW in Sudan and another example for why UNMAO's work ought to be supported.

Figure 32: The view of "the new road" from the lead convoy vehicle. The small shapes to the right of center are estimated to be several miles away. Photo from March 2011.

Conclusion

These accidents, regularly occurring but not numerous, highlight a challenge within the clearance-oriented regime and how this regime within mine action shapes – and sometimes physically disfigures – those who are affected by mines/ERW. The constellation of detection and clearance technologies employed within this regime are constrained not only by financial resources but by the expectations of a professional international organization attempting to meet the requirements of varied social groups. While there is a demonstrable material benefit delivered to communities across Sudan from this regime's work, ultimately UNMAO works as an international organization from the global North ought to work. In no small part, this enables UNMAO to continue receiving donor support. This is qualitatively different from activist-oriented regime efforts and subsequent presentation of such efforts to donors.

One aspect of UNMAO's work which illustrates this point is the office's issue with residual liability: establishing responsibility and proscribed procedures for accidents in previously cleared areas. Even in the office's last year of operations, no such regulations and guidelines existed.[3] Nor was psychological counseling required to be

[3] Jihad Samhat, *Board of Inquiry Summaries and Recommendations into Accidents and Incidents Throughout the Sudan-MAP Programme AOR 2010* (Khartoum, Sudan: United Nations Mine Action Office, n.d.), 7.

available to any mine action personnel involved in accidents. Conducting empirically effective clearance across the country without establishing or codifying residual liability or having personnel well-being fully addressed symbolizes how the different parts of UNMAO operate within distinct regimes of perceptibility.

To reiterate a critical point about the clearance-oriented regime, mines/ERW are "brought into existence in multiple, often conflicting circumstances – the results of not just specific environments but also new arrangements of technologies and practices."[4] Through such circumstances, various social groups apprehend the explosive contamination in the landscape, yet oftentimes issues like residual liability do not neatly fit within a given regime of perceptibility. For the clearance-oriented regime, residual liability challenges the technical expertise that underpins this regime.

Returning to a key point from the beginning of this chapter, the majority of UNMAO's clearance activities do not produce missed mines or accidents during and after clearance. At the same time, some of the accident investigations and Boards of Inquiry contained recommendations that were never implemented. At a systemic level, I have shown how the reports from these investigations and boards have normalized risks and negative outcomes as a generally unspoken but

[4] Murphy, *Sick Building Syndrome and the Problem of Uncertainty*, 8.

inevitable outcome within the clearance-oriented regime.[5]

Such a regime is situated within sometimes-conflicting perspectives. While clearance organizations have maintained that "Sudan doesn't have a mine problem" (in other words, mine contamination is not heavy or widespread), such organizations simultaneously present themselves as the only group able to mitigate and remove a potentially omnipresent threat. While the contamination may not be widespread, determining where it exists and subsequently clearing it requires a thorough investigation. Over the course of such investigations and clearance, mine action groups engage with some audiences who are in some proximity to the details of clearance that such work is about "risk management." On the other hand, mine action presents a simple dualistic/binary discourse to the people and communities most affected by mines/ERW: "before we came the land was unsafe; now it is clear." UNMAO's work of clearance – of (re)constructing environmental knowledge – fills the space between these two accounts, leaving little room for other ways to frame Sudan's contaminated landscapes.

[5] For a discussion of normalized risks, see Vaughan, *The Challenger launch decision*, 195.

CONCLUSION: AFTER INDEPENDENCE AND WHAT MAY COME

Shortly after I left Sudan at the end May 2011 and one month before the UN Mission in Sudan concluded its peacekeeping operations, armed hostilities broke out between the North and newly independent South. What was once a civil war had become a smaller scale-war, and the most mine impacted states of Southern Kordofan and Blue Nile State were once again the sites of conflict. Beyond the inevitable ERW from weapons used by the opposing soldiers, there were reports of the North and South reverting to laying landmines once again. *Landmine Monitor*'s most recent update of Sudan at the end of 2011 read in part,

> both the SAF and the SPLA are reported to have laid anti-personnel land mines in strategic areas of Kadugli town [capital of South Kordofan state]. In particular, the SAF is reported to have mined the Kalimo neighbourhood and the SPLA is reported to have laid land mines in areas around the deputy governor's residence.[1]

Landmine Monitor based its reporting on reports obtained from various UN agencies including the Department of Safety and Security and the Office for the Coordination of Humanitarian Affairs, with the latter "(estimating in July 2011) that mines or unexploded ordnance contaminate more than one third of Kadugli, including three schools."[2]

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[1] International Campaign to Ban Landmines, "Sudan."

[2] Ibid.

Equally troubling is while the Sudan Armed Forces continue its denials, reports of cluster munitions strikes in Southern Kordofan's Nuba Mountains appeared in both Sudanese and international media.[3]

[3] "Cluster Bomb Found in Sudan's South Kordofan," *Sudan Tribune*, May 25, 2012, http://www.sudantribune.com/Cluster-bomb-found-in-Sudan-s,42704; "Sudan's Army Denies Using Cluster Munitions in South Kordofan," *Sudan Tribune*, May 28, 2012, http://www.sudantribune.com/Sudan-s-army-denies-using-cluster,42728.

Figure 33: A box of No. 4 antipersonnel landmines, ready to be armed and laid in the Nuba Mountains region by the North's Sudan Armed Forces. The writing on the crate is in English with metric units. This photo was taken by documentary filmmaker Peter Moszynski and uploaded to Facebook on March 3, 2011. Moszynski's photos gained wide exposure after Nobel Peace Prize Laureate Jody Williams posted a link on her Facebook page to this photos and the others included here. Photo from Facebook from March 2012.[4]

[4] Peter Moszynski, "Wall Photos," *Facebook*, March 3, 2012, https://www.facebook.com/photo.php?fbid=10150580001584612O&set=a.579422911 19.81905.586966119&type=1.

Figure 34: A cluster munition from an attack by SAF in the Nuba Mountains region. Photo from Facebook from March 2012.[5]

[5] Peter Moszynski, "Wall Photos," *Facebook*, March 3, 2012, https://www.facebook.com/photo.php?fbid=10150580015826120&set=a.57942291119.81905.586966119&type=1.

Figure 35: Moszynski describes the photo as a burning home in Taroji (also anglicized as Trogi by the UN), a village in the Nuba Mountains region, evidence of a SAF air raid. UNMAO had cleared the mines/ERW from Taroji approximately on year earlier, and the Landmine Impact Survey community map in chapter 1 is of this area. Photo from Facebook from March 2012.[6]

Sudan's return to belligerency despite its reduction in size precludes the type and scale of mine action activities and research that temporarily reshaped the country from the signing of the Comprehensive Peace Agreement in 2005 to the secession of South Sudan in 2011. It is not clear at the present if mine action activities on the same scale as pre-Southern independence will be possible or at a scale to make Sudan free from the impact and threat of mines/ERW in the foreseeable future.

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[6] Peter Moszynski, "Wall Photos," *Facebook*, March 3, 2012, https://www.facebook.com/photo.php?fbid=10150580030036120&set=a.57942291119.81905.586966119&type=3&theater.

Nevertheless, the span of nearly a decade with significant, large-scale, internationally backed mine action activities in Sudan still provide insights worth considering. For science and technology studies, researching mine action offers for consideration a different perspective on "local knowledge" and its value in certain top-down, outsider driven enterprises.

While the location and quantity of mines is at times contested between mine action organizations, local communities, Sudanese authorities, and mine action donors, *how* those mines are cleared is a largely settled question. As I have shown in this dissertation, actors within the activist-oriented regime black-box mines/ERW: these explosives were placed by someone, either the North's or South's soldiers, but sometimes from unknown sources; they are hazardous; others should and shall remove them. Unlike chemical exposures, side effects from vaccines, or the efficacy of a therapeutic treatment, mines/ERW are the subject of less contestation, and what contestation does exist is less critical. While Michelle Murphy makes the thought provoking point that the question "do chemical exposures exist or not" is the product of particular histories and politics, and reveals much about any who answer that question, such a question in mine action also has particular histories, but not one that is adversarial as the ones Murphy delineates.

In light of this relative lack of contestation over how to *clear* mines/ERW, one question facing policy and decision makers involved in mine action is *should* there still be continued support for mine action? The overwhelming majority of mine/ERW victims, some of whom survive, are innocent civilians rather than the soldiers that were ostensibly the target of these weapons. Yet, to reiterate figures from the introduction, approximately 5,500 mine/ERW casualties occur annually across the globe. While large-scale delivery of humanitarian relief like food relief require mine/ERW-free roads, distribution centers, and paths for people to travel, the large swaths of land cleared by manual deminers, mine detection dogs, and mechanical assets in Sudan typically reveal no mines/ERW even after the codification of land release. For some policy and decision makers, along with groups more directly in mine action, such mine/ERW clearance efforts at an average cost of US$10/meter ought to be directed towards other humanitarian concerns.

Thus, one recommendation for UNMAO and other mine action organizations who may operate within a similar constellation of circumstances is to continue clearance efforts under the current "land release" policies. The materiality of mines/ERW – or more specifically in certain areas, the lack thereof – justifies the prioritization of finding mines/ERW in the most likely locations, i.e., places where soldiers in

one of the military forces in Sudan's civil wars would lay mines or fire weapons. Even as all mine action actors point to the significantly higher costs of clearance over impact surveying and mine-risk education, and clearance critics point to a seeming disconnect between the cost to clear a square meter and the apparently few mines/ERW uncovered, it is important to remember that it is *through* and *after* clearing an area that statements can be made about the few number of mines/ERW. Moreover, prioritizing clearance as the clearance-oriented regime does enables mine action to address the materiality that underpins the whole profession in a way the activist-oriented regime does not. This point about the two regimes of perceptibility in mine action can illuminate the different kinds of work that occur within a field like mine action that to outsiders seems unified.

By highlighting how the activist-oriented regime and the clearance-oriented regime shape and order Sudan's contaminated landscapes – and more importantly for policy and decision makers, present options for addressing mines/ERW – this dissertation presents the opportunity for policy and decision makers to decide what their strategy and end state is for this issue in Sudan. While the activist-oriented regime prioritizes programs like socio-economic impact surveying and mine-risk education, the clearance-oriented regime for the most part eschews local communities' involvement for targeted

removal of mines/ERW.

There is no *a priori* reason why these two regimes cannot co-exist, and indeed, one of the strengths of STS has been to show heterogeneity where isolated monoliths were thought to exist. This does not necessarily lead to the conclusion that all regimes ought to be weighted equally. As Michelle Murphy argues, "in an uneven world, some ways of perceiving inevitably overshadow others, and some ways just work better, more consistently, and are useful to a wider range of actors."[7] Thus, if policy and decision makers are under perpetual and potentially increasing financial constraints, they may have to be strategically selective about what their resources can support. Using regimes of perceptibility can not only illuminate the different options for action within a field or profession, but also illuminate where those options originated.

Moreover, the concept of regimes of perceptibility in this dissertation has highlighted how individual actors, groups, and organizations largely look to and accept outside expertise to address the threat of mines/ERW in Sudan. While some mine action organizations draw local communities' knowledge into an activist-oriented regime of perceptibility, the mine action efforts within this regime – namely, the Landmine Impact Survey and mine-risk

[7] Murphy, *Sick Building Syndrome and the Problem of Uncertainty*, 177–178.

education – do not garner the same support from outside experts and donors as the mine/ERW removal work done through the clearance-oriented regime. For the communities who face the threat of mines/ERW, local knowledge cannot address the material hazard as effectively. Although activists and STS scholars often valorize local knowledge, the outsider expert's knowledge and the larger clearance-oriented regime are not exempt from scrutiny, as I demonstrated in chapter three.

The complexity of mine/ERW-contaminated landscapes and the different regimes of perceptibility at work addressing these landscapes highlights the challenging task both outside experts and local Sudanese communities face now and unfortunately in the foreseeable future.

LIST OF INTERVIEWS

New York, NY, December 2009

Takuto Kubo, United Nations Mine Action Service

New York, NY, January 2010

Sharif Baaser, UNICEF

Takoma Park, MD, February 2010

Robert Eaton, Survey Action Center

Takoma Park, MD, March 2010 (via phone)

Robert Eaton, Survey Action Center

Washington, DC, March 2010

Emma Smith, U.S. Department of State

John Stevens, U.S. Department of State

Sibenik, Croatia, April 2010

Frank Abel, Geneva International Centre for Humanitarian Demining

Ashley Williams, MECHEM

Manchester, England, May 2010

Adam Komorowski, Mines Advisory Group

Phil Halford, Mines Advisory Group

Geneva, Switzerland, May 2010

Erik Tollefsen, Geneva International Centre for Humanitarian Demining

Sharmala Naidoo, Geneva International Centre for Humanitarian Demining

Inna Cruz, Geneva International Centre for Humanitarian Demining

Debrezyno, Poland, May 2010

Chris Clark, United Nations Mine Action Service

Oslo, Norway, May 2010

Rune Andresen, Norwegian People's Aid

Vanessa Finson, Norwegian People's Aid

Khartoum, Sudan, November 2010

Leonie Barnes, United Nations Mine Action Office

Kassala, Sudan, March 2011

Ahmed Mohammed Ahmed Gassim, Elder of Shalalob

Ibrahim Mohammed Adil, Chief of Shalalob

Kassala, Sudan, April 2011

Miriam Hajaj Karar, Friends of Peace and Development Organization

Amouna Ali Dirar, Friends of Peace and Development Organization

Babiker Jamel, Friends of Peace and Development Organization

Idris Hamdeen, National Mine Action Center (Sudan)

Graham Rees, RONCO Consulting

Wajdi Agrab Ahmed, United Nations Mine Action Office

Elfadil Ismail Koura, Friends of Peace and Development Organization

Khartoum, Sudan, April 2011

Stephen Fantham, United Nations Mine Action Office

Armen Harutyunyan, United Nations Mine Action Office

Khartoum, Sudan, May 2011

Mohamed Eltayeb, National Mine Action Center (Sudan)

Boutros Hobeika, United Nations Mine Action Office

UNMAO quality assurance officer, (anonymous)

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